

A Report in Support of

**INSTITUTIONAL MODELS: LAND RECORDS
MODERNIZATION STATE PROFILES**

Prepared for the

NEBRASKA GIS STEERING COMMITTEE

Report Date: July 31, 2003

Prepared by:





Corporate Office

1716 Fordem Avenue
Madison, Wisconsin 53704
Phone: 608-241-7100
Fax: 608-241-7116

Illinois Office

950 Lee Street, Suite 202
Des Plaines, Illinois 60016
Phone: 847-824-6404
Fax: 312-896-5917

Florida Office

330 Clematis Street, Suite 214
West Palm Beach, Florida 33401
Phone: 561-655-1216
Fax: 561-655-0681

Web Site: www.geoanalytics.com

Email: office@geoanalytics.com

Nebraska GIS Steering Committee Members

Rex Amack	Nebraska Game and Parks Commission
Alan Beiermann	Nebraska Public Power District
James L. Brown	Nebraska State Surveyor and Committee Chair
Lash Chaffin	League of Nebraska Municipalities
John L. Craig	Nebraska Department of Roads
Lauren L. Hill	Governor's Policy Research Office
Mark Kuzila	Conservation and Survey Division
Cathy Lang	Nebraska Property Tax Administrator
Mark Linder	Nebraska Department of Environmental Quality
Lori McClurg	Nebraska Department of Administrative Services
Scott McIntyre	Omaha Public Works, representing Public At-Large
John Miyoshi	Lower Platte North NRD, representing Natural Resource Districts
Richard P. Nelson	Nebraska Health and Human Services System
Patrick J. O'Donnell	Nebraska Legislature
Roger Patterson	Nebraska Department of Natural Resources
Sonja Seabee	U.S. Geological Survey, representing federal agencies
Duane Stott	Scottsbluff County Surveyor, representing Public At-Large
Cliff Welsh	President, Nebraska Association of County Officers
Larry Worrell	Lancaster County Surveyor
Larry K. Zink	GIS Steering Committee Coordinator

Project Team

Nebraska

Larry Zink	Coordinator, Nebraska GIS Steering Committee
------------	--

GeoAnalytics, Inc.

William Holland	GeoAnalytics, Inc., Principal, Project Manager
Pete Thum	GeoAnalytics, Inc., Systems Architect
Lea Shanley	GeoAnalytics, Inc., Research Analyst & Project Coordination
Puneet Kishor	GeoAnalytics, Inc., Web Developer

Table of Contents

A. Executive Summary	1
1. Kansas	1
2. Minnesota	2
3. Montana	3
4. Oregon	4
5. Tennessee	5
6. Virginia	7
7. Wisconsin	8
8. Indiana	10
9. Utah	11
B. Institutional Models	12
1. Kansas	12
2. Minnesota	25
3. Montana	47
4. Oregon	59
5. Tennessee	74
6. Virginia	88
7. Wisconsin	108
C. Institutional Models: Brief Profiles	130
1. Indiana	130
2. Utah	138
Appendix A: State Participants	155
Appendix B: Selected Oregon Statutes Relating to Land Information	157
Appendix C: 70th Oregon Legislative Assembly - 1999 Regular Session, House Bill 2139	161
Appendix D: Virginia Acts of Assembly - 2002 Session	167
Appendix E: Wisconsin Statutes Applicable to the Land Information Program	169
Appendix F: Wisconsin Land Information Program Strategic Assessment Matrices	179

Table of Tables

Table 1: Minnesota Framework Data Initiative Data Themes	38
Table 2: Montana Spatial Data Infrastructure Data Themes	54
Table 3: Oregon Framework Data Initiative Data Themes	67
Table 4: Tennessee 2001 State Lands Breakdown	79
Table 5: Estimated Costs for the Tennessee GIS Base Mapping Program	86
Table 6: Estimate of Annual Costs of Maintaining Land Records in Wisconsin: 1990-1999	123

Table of Figures

Figure 1: Kansas IT Governance Model	16
Figure 2: DASC FY02 Organizational Structure	17
Figure 3: ORMAP Structure	66
Figure 4: Oregon Data Standards Development and Adoption Process	72
Figure 5: Office of Information Resources Organizational Chart.....	78
Figure 6: Tennessee Spatial Data Architecture	84
Figure 7: Virginia Secretary of Technology Organizational Chart	92
Figure 8: WLRC Conceptual Model	109

A. Executive Summary

The following section provides an overview of the findings of the State Profiles. Each summary is broken out into two sections. The first provides an overview of the drivers and policies. The second section offers some lessons learned from these States' experiences.

1. Kansas

a. Overview

The principle driver for land records modernization in Kansas has been the appraisal process. A series of challenges to assessments including unreported lower court decisions (unreported) in the early 1980s highlighted inadequacies within the Kansas system of property assessment. In addition, the state agency responsible for assessment and equalization, the Property Valuation Division, came to recognize the State's vulnerability in meeting its constitutional mandates because of the poor condition of land records and the mechanisms defined by statute. As a result, the Kansas Legislature enacted K.S.A. 79-1476 (1985), which set into motion a statewide reappraisal and classification program¹. During this reappraisal process, the State worked closely with local governments to develop new property parcel maps according to enhanced state mapping standards. While the re-mapping was completed prior to widespread GIS adoption, the resulting mylar-based property parcel maps have provided a solid foundation for subsequent GIS implementation at the local government level. In addition, the reappraisal program prompted the development of a uniform, statewide Computer Aided Mass Appraisal (CAMA) system, which is currently in the process of being updated so as to be compatible with GIS technology.

Under the statewide reappraisal program of 1986-89, the state provided funding for local efforts, and hence, the counties adhered to state technical specifications in the development of their property ownership maps. As state funding has diminished, however, the decision as to whether or not to automate parcel mapping has devolved to the counties. Counties, as a result, have become more independent as they move from manual mapping to digital mapping and GIS.

Today, the GIS coordination model is integrated into the overall information technology (IT) governance model. However, explicit state programmatic funding for statewide geospatial data development and coordination does not exist. Funding for database development projects is provided largely by the Kansas Water Plan. The State GIS Director's Office staffing and administration costs, as well as clearinghouse site expenses, are funded through a computer rate-based charge to state agencies that use the central computer system. Larger initiatives, such as the Kansas Aerial Photography Base Mapping Project, are funded through contributions from multiple state and federal agencies. The Kansas Legislature, on the other hand, has established an additional recordation fee of \$2, which is deposited into register of deeds technology funds at the local level.

¹ This legislative history was provided, in part, by an interview with the former Director of the Property Valuation Division who served during this time, Vic Miller. Other state and officials were also interviewed.

Kansas has made several strides towards statewide land records modernization, but a formal statewide program for automation is needed, along with greater policy and fiscal support at the top levels of state government and perhaps better enforcement of statutes already in place.

b. Lessons Learned

Under the statewide reappraisal program of 1986-89, the state provided funding for local efforts, and hence, the counties adhered to state technical specifications in the development of their property ownership maps. As state funding diminished, however, the decision as to whether or not to automate parcel mapping has devolved to the counties. Counties, as a result, became more independent relative to standards as they moved from manual mapping to digital mapping and GIS.

At the local level, impediments to modernization include a lack of resources, particularly, time and technical expertise. The strong sense of local autonomy has worked in their favor, but has been something of an impediment to the development of integrated systems on a statewide basis.. Some counties have experienced significant turnover in trained personnel, although others have sought vendors for technical guidance.

Many in Kansas believe a more formal statewide program for automation is needed along with greater policy and fiscal support at the top levels of state government and perhaps with better enforcement of statutes already in place.

2. Minnesota

a. Overview

The primary drivers of land records modernization in Minnesota are state level land management, state level coordination and control, and local control and autonomy. Minnesota has taken major steps towards statewide land records modernization and, as part of this process, has developed an impressive body of research and documentation. Beginning in 1991, the Minnesota Legislature established an equipment fund that enabled recording offices to purchase computers, wide- or local-area networks, and document imaging systems. Grassroots support for a coordinated statewide effort led to the creation in 2000 of the Electronic Real Estate Recording Task Force (ERERTF), which was charged with examining the feasibility of implementing a system for electronic filing and recording of real estate documents.

During 1990s, the Minnesota Governor's Council on Geographic Information (GCGI) created the Parcel Data Committee to develop strategies for parcel-level data development as well as parcel data standards and guidelines, but this committee was disbanded in 1997. In addition, GCGI created the Land Records Modernization (LRM) Committee to examine strategies for legislative funding of GIS. After exploring several funding strategies proposed by other states, the LRM Committee presented a proposal for a statewide land records modernization program, the emphasis of which was on allowing counties to retain local control of system design and implementation, while ensuring adequate and stable funding for modernization efforts. While this proposed LRM program serves as a basis for ongoing discussions, it has not been funded and is not being promoted actively by the GCGI.

Today, the LRM Committee is working within the context of the I-Team Initiative, a joint project of the Federal Geographic Data Committee (FGDC), the Federal Office of Management and Budget (OMB), and other strategic partners. As part of this effort, the LRM Committee is in the process of developing a Cadastral Implementation Plan (I-Plan). MetroGIS also received designation as an I-Team. Of note, MetroGIS coordinates the assembly of parcel data produced by the seven counties in the Minneapolis-St. Paul Metropolitan Area and distributes the resulting regional parcel data set to the MetroGIS community

b. Lessons Learned

Unfortunately, the Minnesota GIS community has been unable to make an effective business case for investing in GIS, and hence, has been unable to develop a functional statewide program. In part it is believed that the State should find funding for a statewide land records modernization program. In the future, advocates will have to reframe the discussion to better address local needs and concerns for land records management.

Even so, Minnesota has consistently demonstrated a strong commitment to state level coordination and development.

Another area of possible concern is data access policy. Under Minnesota Statutes Chapter 13, counties are permitted to retain ownership of and to sell their data for more than the cost of reproduction.

3. Montana

a. Overview

Montana is ahead of most states in the collection and standardization of parcel data. Three principal drivers propel statewide coordination and data development efforts: state driven equalization and assessment, large public land holdings, and the Natural Resource Information System (NRIS) at the Montana State Library, which serves as the clearinghouse for all spatial data in the state.

Through the coordinated efforts of eight regional field offices of the Montana Department of Revenue (DOR) Compliance, Valuation and Resolution Division (CVR), the State has assumed county assessment functions in all but eight counties; thus, most county parcel mapping is standardized and linked with the state's CAMA database. In addition, the Montana Cadastral Mapping Project (MCMP), a cooperative effort between the Montana Department of Administration (DOA), the Montana Department of Revenue (DOR), the BLM, local governments, and the private sector, has greatly facilitated the creation of a digital statewide parcel layer. This effort, launched in 1996, utilized two data elements for automated parcel mapping: 1) the DOR CAMA database, which provided legal land descriptions defining aliquot parts for all assessed property in the state, as well as geocodes and other associated information; and 2) the BLM Geographic Coordinate Data Base (GCDB), which provided the framework of coordinates defining the public land survey system (PLSS). With these two data elements and the aid of in-house software, digital parcel maps were generated for almost the entire state. Building upon the success of the MCMP, the Montana Spatial Data Infrastructure (I-Team) initiative is now close to achieving a seamless, statewide cadastral database. One of the next priorities for the Cadastral I-Team will be to collect

GPS control to increase the accuracy of the underlying PLSS. To compliment these efforts, the Geodetic Control I-Team is planning an on-line database for storing, querying and accessing control data, while the Imagery I-Team has acquired one-meter resolution USGS orthophotographs (DOQQs) for the state.

Basic and enhanced 911 and addressing is another initiative where statewide coordination has been successful. The Department of Administration's Information Services Division (ITSD), which serves as the lead agency for the provision of information technology infrastructure, is responsible for disbursing 9-1-1 funds to local governments and for assisting local governments in the development of E-911 implementation plans. Under this structure, GIS and GPS-related expenditures, if coupled with an E-911 addressing project, can be funded through the Basic or Enhanced 9-1-1 Emergency Telecommunications Account.

Overall, the Montana land records modernization program has been extremely successful in its incremental approach. The Montana State Library, which serves as a central organized repository for spatial data, is one of several major benefits. Unfortunately, however, state budget cuts have eliminated all DOR funding for parcel mapping development outside of parcel maintenance. Because of severe budget constraints, the GIS Services Section and Montana Geographic Information Council (MGIC) are pursuing a two pronged approach. In the short-term, they hope to obtain the funding needed for FY04/05 through a partnership of state and federal agencies. In the long-term, they intend to introduce legislation for a recording fee.

b. Lessons Learned

The biggest institutional impediment has been trying to standardize local data. In retrospect, methodologies for enhancing the accuracy of GCDB and thus the parcel layer should have been negotiated between BLM and the state earlier in the program.

Montana represents a solid program. It is a reflection of the socio-demographic circumstances of the State, namely large state and federal land holdings, very sparse population. The lack of similarity between Nebraska and Montana may make some of the positive aspects of their programs inapplicable to the circumstances in Nebraska.

4. Oregon

a. Overview

In the early 1950s, the Oregon legislature initiated a statewide reappraisal program, which highlighted the inadequacy of existing assessors' maps. However, it was not until 1997 that every county was brought up to statewide standards. Today, three principle drivers provide the impetus for land records modernization in Oregon, including the perceived need for statewide, standardized parcel development, considerable public lands, and historical inventories.

Oregon has implemented a state-local government cooperation model that utilizes regional entities as a vehicle for collaborative land record modernization. Known as the Oregon Mapping Program (ORMAP), this initiative focuses on three components: 1) digital maps of taxlots, taxcodes, and basic taxing districts; 2) digital images representing the standard assessor's taxlot map; and 3) digital tables containing descriptions of taxlots. The Oregon Department of Revenue (DOR) administers

ORMAP, with the assistance from the Technical and Advisory Committees, both of which include participants from local, state and federal agencies, the private sector, and other interested parties. The ORMAP Advisory Committee, in particular, allows local governments to have a voice in setting program priorities and in determining how the money should be allocated.

To support the development of a seamless basemap system, ORMAP divides the state into nine regions and appoints regional coordinators to each. Two separate funds were established to support this program: 1) the Regional Funding Program, which distributes funds amongst these regions; and 2) the Discretionary Funding Program, which funds individual county projects. ORMAP also provides grants to counties for the densification of geodetic control. Funding for ORMAP is generated through a \$1 per document recording and filing fee, collected by the counties and deposited into the state fund on a quarterly basis. These fees generate about \$200,000 - \$300,000/quarter statewide. GIS coordination and the Oregon Geospatial Data Clearinghouse, on the other hand, are funded by all state agencies through an assessment plan that nets approximately \$1.5 million per biennium.

Finally, county property assessors annually provide the State with their parcel attributes databases as well as a set of scanned images of their assessment maps for posting to the ORMAP website. The Department of Revenue digitally maintains the assessment maps for nearly half of the counties in Oregon.

A key factor to the success of the Oregon Mapping Program (ORMAP) is its administrative structure. While the Department of Revenue (DOR) administers ORMAP and the grants program, local governments have a tremendous amount of control over how the program operates.

b. Lessons Learned

The Oregon model is instructive for Nebraska, particularly as it relates to regionalization. In particular, Oregon's experience with implementing a state/local government cooperation model that seeks to develop regional entities to facilitate collaborative land record modernization. As a result of this effort, all counties in the state have joined in some type of regional cooperative entity for land record management based on the Regional Funding Program Fund. The criteria established for distributing these funds to local governments have been met with a reasonable level of approval from both urban and rural counties.

The downside to the Oregon model is that is heavily dependent on state government funding, oversight, and intervention.

5. Tennessee

a. Overview

Drivers of statewide land records modernization in Tennessee include a history of state level parcel mapping, a tested business case through a base mapping pilot program, and a need to effectively and efficiently manage one of the single largest sources of revenue for local governments.

During the 1962/1963 reappraisal process, the Tennessee Comptroller of the Treasury manually created parcel maps for all 95 counties in the State using a common indexing scheme. As a result, Tennessee has a statewide base map in a common coordinate system upon which to build their current efforts. In 1996, the Comptroller of the Treasury initiated a pilot program in two counties as a precursor to the development and implementation of a statewide parcel-mapping program. Subsequently, the Legislature authorized and provided funding for the Tennessee Geographic Information System (GIS) Base Mapping Program, a five-year effort, coordinated by the GIS Services Division, Office of Information Resources, to develop a uniform statewide digital base map consisting of high-resolution digital orthophotography and a digital parcel layer, the specifications of which meet the needs of both county and municipal governments as well as those of state agencies.

Today, the Comptroller of the Treasury maintains parcel maps for 80 of the 95 counties as well as property assessment attribute data for 90 of the 95 counties. Those counties that choose to maintain their parcel maps at the local level are required to supply a copy of their digital parcel data annually to the Comptroller's Office. Thus, maps and attribute data for the majority of parcels within the state are centrally located and readily available in an identical format. In addition, through the state's Computer Assisted Appraisal System (CAAS), the Department of Property Assessments (DPA) and the Office of Management Services provide data processing services to local governments for property tax administration. A web-based CAAS query application was implemented so that other state agencies as well as Assessors' Offices could access the system on-line. Efforts to expand CAAS functionality are underway; this new system will combine the attribute data from CAAS with the parcel-level digital map data developed through the GIS Base Mapping Program, providing complete access to the CAAS database in a geographic environment. The Tennessee Spatial Data Architecture (SDA) initiative will build on this program and provide a framework for the utilization of data products generated.

Initially, the anticipated mix of funding for the Base Mapping Program was 25% per county from county and local government partnerships and 75% from a combination of state, Federal, private sector, and public and private utility funding sources. In reality, many areas within the state have economies that cannot support this level of investment. Only 35-40% of the counties in Tennessee can meet the goal of 25% local participation, which represents a mere 12-15% of local government share. Thus, the Business Plan explored a variety of cost recovery options and estimated that 8% of local participation costs could be recovered through data licensing and sales.

The Base Mapping Program (BMP) has been very successful. The fact that the State covered 75% of the cost of the base mapping for each county proved to be a tremendous incentive for local participation and for local compliance with data standards. To date, the BMP has enlisted the participation of nearly 30 Assessors' Offices. Two important elements that have contributed to the success of the Base Mapping Program are: 1) the Business Plan, developed in 1998; and 2) the Spatial Data Architecture. Both the Business Plan, which includes cost models and analysis, and the Spatial Data Architecture, which presents an overview of the technological infrastructure, provide direction for the program and have been instrumental in eliciting the legislature's support.

b. Lessons Learned

The most significant impediment in Tennessee is the “digital divide.” Approximately 50% of Assessors’ Offices in Tennessee do not have an Internet connection in their office, and frequently, Assessors’ Office personnel have never used a computer. While an Assessor’s Office may house a terminal and while the necessary infrastructure may be in place, assessors do not always see the benefit of and hence seek out network connectivity for day-to-day operations.

Perhaps the biggest impediment is the economics of modernization, particularly in poorer rural areas. Local officials realize the benefits of GIS; but, in order for them to implement the Base Mapping Program and to cover the cost of a minimal hardware configuration, will present undue hardship, including having to increase the property tax mill rate by 2 to 3 points. In many jurisdictions, there is just not enough of a tax base to support any technological implementation.

Like Oregon, the Tennessee program is heavily dependent on strong state involvement and funding.

6. Virginia

a. Overview

Several factors have driven statewide modernization efforts in Virginia, including: (1) committed leadership at the state level for information technology generally; (2) leadership at the local level—a technology push from 91% of counties that have adopted GIS in one form or another; (3) a broad recognition that technology, from an economic perspective, is best managed locally, but coordinated globally; and (4) new push for land use planning, including the development of planning districts.

In Virginia, circuit court clerks, as constitutional officers, are responsible for the administration of land records. Locally administered, the existing “patchwork” of systems impeded public access to Virginia’s land records. After an assessment of the need and feasibility of land records modernization, including incorporation into a statewide land or geographic information system, the Joint Legislative Audit and Review Commission (JLARC) cited as major impediments the lack of standards for indexing formats, land records content, and records management automation, the limited funding approach to modernization efforts, and a fundamental structural flaw within the Information Technology Trust Fund.

In response, the 1997 General Assembly established the Land Records Management Task Force (LRMTF), which published a strategic plan for modernizing land records.² Using the guidelines provided by the LRMTF, each Circuit Court Clerk produced an individual automation plan and implementation schedule.

Based on these in-depth studies and other needs, the Virginia Base Mapping program was launched. Although funding was initially difficult to obtain, VGIN was able to

² The Task Force defined land records management as “the uniform indexing and preservation of the instruments and data relating to land integrated with local and state geographic information system (GIS) layered data, assessment information, and other public records relating to the land and made available to the public.”

demonstrate the significant cost savings of a coordinated statewide effort. Indeed, the overall estimated cost of providing statewide orthophotography, approximately \$12 million dollars (over four years), was between \$3 and 5 million dollars less than the overall estimated cost of developing digital orthophotography on an independent county-by-county basis. Because a consistent, statewide, high quality, high-resolution base map is necessary to accurately pinpoint cellular callers, the Public Safety Commission Board agreed to subsidize the Virginia Base Mapping Program (VBMP) as part of their Phase II Wireless E-911 implementation efforts. The VBMP began in earnest at the beginning of 2002. Under this program, every county and municipal government in Virginia will receive a set of full color, leaf-off, digital orthophotography, developed at one of 3 scales, as well as a Digital Terrain Model (DTM) and ancillary data. While this product will be provided free of charge to all government and public sector organizations in Virginia, a licensing agreement will restrict redistribution of this data.

In some respects, statewide land records modernization efforts have not been as successful as was hoped. Virginia still lacks state level oversight of local land records modernization. However, by consolidating and coordinating base mapping efforts at the state level, Virginia saved several million dollars when compared to the expense that would have been incurred if the orthophotography had been acquired on a county-by-county basis. Now, each community will have an accurate base map upon which to build spatial data and applications.

b. Lessons Learned

Because a state parcel mapping standard is not in place, local governments vary in how they map, store, retrieve, and maintain parcels. For example, some counties use unique parcel numbers, which are assigned by the Commissioner of Revenue, while others use geo-codes at longitude and latitude. These differences will be a major logistical hurdle in the development of a statewide parcel database.

In Virginia, local governments lead and drove the modernization process. The State became involved when it realized that local government had developed many stovepipe systems. By being reactive, not proactive, the State of Virginia lost the opportunity to maximize cross-jurisdictional benefit.

7. Wisconsin

a. Overview

Wisconsin has one of the longest running and most proactive statewide land information programs in the nation. Wisconsin has funded local government land information programs, with state oversight and coordination, standards, and requirements for local coordination and planning. Much can be learned from Wisconsin's considerable experience, good and bad, with a variety of policy and administrative structures related to statewide land information systems. Wisconsin also has looked closely at the overall costs of maintaining land records and the costs of land record modernization.

Drivers to statewide land records modernization efforts have included: 1) strong academic interest, both from the University of Wisconsin in the form of pure research and from the State Cartographer's Office; 2) strong professional associations and

interests; and 3) the perception of progressive government in Wisconsin. Formal efforts towards statewide land records modernization began in 1985 with the establishment of the Wisconsin Land Records Committee (WLRC), tasked with examining the needs of state and local agencies regarding land information collection and with developing a set of recommendations for statewide land records modernization. Today, the WLIP is a voluntary, statewide program that provides financial and technical support to local governments for land records modernization efforts. All seventy-two Wisconsin counties currently participate in the WLIP.

Funding for the program is generated through a seven dollar increase in a user fee collected by the County Register of Deeds Office for the filing of documents, two dollars of which is sent to the Wisconsin Land Information Board (WLIB) and five dollars of which is kept by the county to fund land information efforts. In order to be eligible to retain fees, a county must designate a local Land Information Officer (LIO), submit a land records modernization plan for WLIB approval, and earmark spending for modernizations. In addition, eleven state agencies must submit plans to the WLIB annually.

After subtracting a percentage for administration costs, the WLIB redistributes its share of these revenues to local governments to provide base funding so that every county has some funding to support the automation process. During the first six years of the program, these funds were distributed via a competitive grants-in-aid process. In 1996, however, a formula-based approach was adopted such that every county now receives a “base level” of funding (\$35,000 in 2002). WLIP funding may be used for the following: 1) the design and implementation of a land information system; 2) the preparation of parcel property maps; 3) the preparation of maps for local planning purposes; 4) systems integration; and 5) training and education in land information systems. Grants that address strategic initiatives, such as digital soils mapping and metadata creation, have been available as well. As a result, some counties receive more monies than they would have generated by fees alone.

Through the recording fee, the WLIP generates approximately \$7-million per year, depending on fluctuations in the real estate market and interest rates. Since the program’s inception, the WLIP has generated over \$90-million dollars, which includes fees retained by the county as well as those submitted to the state, and has awarded \$22,139,852 to local governments for local land information programs, land information systems and parcel property mapping, as well as for other associated foundational elements.

From a county perspective, the Wisconsin Land Information Program (WLIP) has been very successful. From a statewide perspective, however, the program has not been as effective. Unfortunately, there has been an overall lack of will to enforce standards statewide, to track federal standards development, or to enforce state agency cooperation and coordination through agency budgeting controls. Land Information Program fees have been structured with funding sunsets to keep the community focused on moving forward and producing tangible results.

Benefits of the WLIP include statewide digital orthophotography, statewide digital elevation data, a High Accuracy Reference Network (HARN), and a focused floodplain mapping effort. In addition, nearly half of all counties have had their soil surveys digitized and certified by the NRCS. Specific benefits include: 1) a reduction in land transfer costs; 2) a reduction in flood insurance costs; 3) the expedition of natural

disaster mitigation and management support; and 4) the facilitation of comprehensive planning.

b. Lessons Learned

Standards are a critical factor in the success of a land records modernization program. Initially, Wisconsin counties and municipalities were given broad leeway so as to encourage full participation in the WLIP; but, this policy resulted in 72 county systems that are not easily integrated or compared across boundaries. In hindsight, standards regarding coordinate systems, parcel identification numbers, street addressing, land use classifications, and orthophotography should have been developed and enforced at the inception of the program. A lack of funding for state level activities has an impediment to the development of systems and data that are vertically integrated.

The lack of standards and more direct coordination has resulted in the expenditures in a somewhat unfocused way. For example, many counties in Wisconsin opted to undertake comprehensive Public Land Survey System remonumentation programs before automating land records. While useful for pure mapping purposes, these expenditures did little to advance automation or to improve business processes. These efforts have also made the overall cost of the Wisconsin Land Information Program much more expensive than it could have been if it were more focused.

It will serve Nebraska to learn from this experience, namely to focus on being proactive in the development of standards. And, second to find the right balance of technical standards that will provide the greatest utility from the investments that will be made with being too intrusive and micromanaging statewide systems development.

8. Indiana

a. Overview

A perceived need for state driven equalization and assessment culminated in the requirement that all counties report their tabular data in a standardized electronic format to the Indiana Department of Local Government Finance, the agency responsible for statewide oversight of property tax assessment and local government budgeting. In addition, Indiana established three land records related funds: 1) a recorder's records perpetuation fund that a county recorder may use for the preservation of records and the improvement of record keeping systems and equipment; 2) a county surveyor's corner perpetuation fund; and 3) a property reassessment funds that may be used, among other things, for general reassessment of real property, including the computerization of assessment records and for the development or updating of detailed soil survey data.

In 2001, the Indiana Geographic Information Council (IGIC) established itself as Indiana's I-Team and, as such, has developed a plan for long-term development and maintenance of a cadastral layer. Other initiatives include the statewide acquisition of one-meter resolution USGS digital orthophotography (DOQQs) and the development of the Indiana High Accuracy Reference Network (HARN).

The cost of parcel mapping is borne locally by county governments. An estimated \$12 million dollars will be required to create a complete statewide parcel layer for the state of Indiana, based on a cost of \$7.00 per parcel for data conversion and an additional

\$0.50 per parcel to bring existing digital parcels to a state standard. This figure does not include ongoing maintenance.

Roughly one third of the counties in the state have completed digital parcel mapping; this represents roughly two-thirds of the population. Until recently, efforts have largely met the immediate needs of individual programs and agencies. There is recognition of the overlap that exists and a growing movement towards finding statewide solutions. The opportunity to leverage individual program dollars at the federal, state and local levels is tremendous

b. Lessons Learned

Indiana is in the beginning stages of the development of a statewide system. Many local governments have pursued modernization on their own without direct intervention from the State. Many in the State now recognize that a more statewide perspective will offer greater value. This is particularly true in terms of standards development to ensure that information may be exchanged and shared to ultimately increase the overall value and utility of spatial and non-spatial data investments. This insight, having been made in the relatively early stages of the program is instructive for Nebraska's efforts.

9. Utah

a. Overview

Utah differs significantly from Nebraska in that the majority of its land is federally owned or managed; however, it does offer some organizational models and experience which Nebraska should consider. Utah's GIS policy and programs recognizes the importance of local government involvement. The state-level Automated Geographic Reference Center (AGRC) provides GIS technical assistance, training and service to state agencies and to local governments, particularly in the areas of roads and street address databases and property parcels. At the initiative of its Governor, Utah also has a very proactive geospatial data-sharing program between state, local and federal agencies.

Utah's Rural Government Geographic Information Systems Assistance Program seeks to "afford each county the widest possible latitude in its development and implementation of the County GIS Plan. However, this intent is balanced by the need for the effective use of public funds for programs, which are consistent with, and will ultimately contribute, to the development of a statewide GIS effort." In the first year, the Legislature appropriated \$200,000 to the Automated Geographic Reference Center (AGRC) to assist rural governments with GIS implementation. Subsequent legislatures have supported this level of funding and more for program activities. In addition, the 1999 Legislature appropriated an additional \$450,000 for counties to inventory and map R.S. 2477 Rights-of-Way (ROW) and to develop GIS implementation plans. The Automated Geographic Reference Center administers program funds in cooperation with the Rural Partnership Board, the Utah Association of Counties, and the Twenty-first Century Communities Program. Currently, the Program focuses on assisting counties with the collection of survey control corner coordinate information and digital parcel mapping.

Like many other states, Utah is participating in the OMB and FGDC's Implementation Team (I-Team) Initiative. The Utah Geographic Information Systems Advisory Council (GISAC) serves as the Implementation Team for the state. At the forefront of this initiative is the Utah Cadastral Integration Project. This project will focus on U.S. Public Land Survey System

(PLSS)/Geographic Coordinate Data Base (GCDB) data, ownership information (agency jurisdictions and parcels), and government unit boundaries (where coincident with PLSS boundaries). Three Utah counties serve as pilot project areas for initial Cadastral plan development and implementation. ARGC will serve as the central clearinghouse and data integrator, while the BLM will continue to serve as steward of the GCDB database.

Recognizing the importance of a transportation data layer, the Utah Legislature has also provided funding that enables counties to purchase GIS and GPS equipment to inventory and map every road in their jurisdiction. Furthermore, the Utah Association of Counties has engaged counties in a discussion about rural addressing standards for transportation. Through a cooperative effort with federal and state agencies, ARGC is collecting and integrating this locally generated data to develop a high accuracy statewide road centerline database with address ranges. In the future, local E911 efforts also will benefit from this effort.

Overall, Utah has developed a strong, coordinated land records modernization program. Providing funding to counties, however, does not ensure success. Funding is limited, and existing funds at times have been diverted locally to other immediate needs. Efforts to pass legislation that would institute an additional recordation fee to support land records modernization efforts have been stymied, as have efforts to pass legislation that would impose a user fee for wireless service to fund relevant GIS and addressing activities. In the future, efforts will focus on continuing to educate local and state policy makers as to the importance of GIS and land records modernization. Existing local support will be bolstered with more outreach activities, including training, greater opportunities for participation, and pass-through funding wherever possible

b. Lessons Learned

Utah provides a model for how a state can provide GIS-related technical assistance to local governments and still maintain a relatively high degree of local autonomy. Utah also illustrates the benefits and logical connection between providing local governments with GIS-related technical assistance for parcel mapping and street centerlines/address databases.

B. Institutional Models

1. Kansas

Between 1985 and 1989, Kansas conducted a statewide reappraisal and classification program, mapping over 1,422,000 parcels and generating a complete and comprehensive set of property ownership maps for every county in the state. The reappraisal effort resulted in a statewide rectified aerial photographic base, cadastral line drawings, soil overlays, and assessment administration files. Overall, Kansas spent approximately \$18.2 million on the statewide reappraisal program, or roughly \$12.80 per parcel.³

³ Kansas Basic Mapping Course Book, Chapter 1, p. 3. "On a per parcel basis, costs for the reappraisal maps were as follows: Compilation \$7.55; Drafting \$1.50; Administration \$0.75; Aerial Photos \$1.50; Soil Overlays \$1.50; Total per parcel cost \$12.80. ...The county with the fewest [parcels] is Wallace at 2,779. On the average, there are approximately 14,140 parcels per county."

For nearly two decades, Kansas has been a leader in statewide coordination of geographic information system (GIS) implementation. In 1984, the Kansas legislature created the Kansas Commission on Applied Remote Sensing. Four years later, the Kansas Water Data Committee (KWDC) proposed a multi-agency GIS effort entitled the “Kansas Geographic Information Initiative” in order to facilitate the implementation of the Kansas Water Plan. This proposal recommended the institution of a state GIS data network and a GIS Policy Board. Following the KWDC’s lead, Governor Mike Hayden established the Kansas Geographic Information Systems (GIS) Policy Board in 1989, designating it as the lead entity for statewide coordination of GIS activities by state agencies. Both Governor Joan Finney in 1993 and Governor Bill Graves in 1995 and 2000 reaffirmed support for the Kansas GIS Initiative and for the Kansas GIS Policy Board. The Kansas GIS Policy Board continues its mission today “to ensure a technological environment where GIS is recognized as an integral and indispensable tool for government and businesses to serve the integrated information needs of citizens and customers.”⁴ As a result of these and other initiatives, Kansas provides a broad spectrum of users with open access to GIS data and associated databases. Kansas also is served by the State GIS Director, the State GIS Coordinator, and the Kansas Data Access and Support Center (DASC).

a. Administrative Structures/Coordination Structures and Procedures

Local land records management involves tracking boundaries and ownership of legal parcels and plats, valuation and assessment, property tax collection, voter registration and elections, and land use regulations. In Kansas, land information is collected and maintained locally by a variety of offices, including the Clerk, the Treasurer, the Register of Deeds, the Appraiser, the Cartographer, County Surveyor or Engineer, and Planning and Development departments. Land management (permitting and development) is the responsibility of county and municipal governments and is not regulated by the State of Kansas.

As of 2003, 60 counties out of 105 had implemented GIS in some capacity.⁵ Of those counties, most maintain GIS within the County Appraiser’s Office, the Register of Deeds’ Office, or the information technology (IT) office. As would be expected, in larger urban areas, more of an enterprise approach is taken to GIS implementation.

Kansas has several organizations that guide statewide land records modernization efforts, including: 1) the Kansas Geographic Information Systems (GIS) Policy Board; 2) the Kansas Information Technology Office (KITO) and the State GIS Director’s Office; 3) the Data Access and Support Center (DASC); 4) Kansas Department of Revenue Property Valuation Division (PVD); and 5) the Kansas Department of Transportation (KDOT). The closest approximation to a State Surveyor in Kansas is the KDOT Surveying Unit.

Statewide professional organizations such as the Kansas County Appraiser Association (KCAA), the Kansas Association of Mappers (KAM), Kansas Society of Land Surveyors (KSLS), Kansas Association of Surveyors (KAS), the Kansas Registers of Deeds Association (KRDA), and Kansas Association of Counties (KAC) also provide guidance, education and training.

⁴ The Kansas GIS Policy Board website is <http://da.state.ks.us/gis/>.

⁵ Thematic map of counties using GIS: <http://www.ksrevenue.org/images/ca02-001.gif>.

Major state and federal land owners and administrators, and hence key custodians for parcel information, include the Kansas Division of Water Resources (DWR), the Kansas Department of Wildlife and Parks (DWP), Kansas Social and Rehabilitation Services (SRS), as well as the National Resource Conservation Service (NRCS) and the Farm Service Agency (USDA-FSA). All of these agencies have county field offices. However, SRS, for example, will be cutting down its 160 field offices to 35. Unfortunately, no overall coordination exists for keeping track of these land records. However, Kansas is largely agricultural. Almost 98 percent of the land is held in private ownership, thus only a small fraction of the land is publicly owned and administered.

1) County Clerk

The Clerk is required: to combine all valuations for each tax district and certify values to each tax district and the state; to assist with preparation of township and cemetery budgets and annual reports; to audit all budgets and file with the state; to compute all tax levies and prepare levy sheets; to prepare real estate, personal property and state assessed tax roll; to prepare added and abated taxes to original tax statement/tax roll; to maintain tax unit maps of the county; to balance and certify distribution of motor vehicle taxes; and, to accumulate and file a bonded indebtedness report of all county tax entities. In regards to real estate, the Clerk also must record transfer of ownership from deeds, probates, divorce decrees, death certificates, etc. In addition, the Clerk must maintain a file of real estate by address, legal description, and name.

2) Register of Deeds Office (ROD)

In the state of Kansas, the Register of Deeds is an elected position at the county level; elections occur every four years. Each Register of Deeds Office is the official repository of real estate records (e.g., deeds, mortgages, easements, oil and gas leases, and platted additions), realty related personal property (UCC fixture filings) and vital records (birth, marriage, and death). This office also files federal and state tax liens, mechanics liens on personal property, corporation papers, powers of attorney, county school records and military discharges. Filing fees and required indexes are set by state statute.

Some counties in Kansas make only "paper" copies as the permanent record, while others use microfilm or optical imaging, or some combination thereof. In addition, while some counties have computer-generated databases, others keep hand or typewritten indexes.

3) Appraiser

The County Appraiser is responsible for discovering, listing, and valuing all property. The Appraiser's goal is equalization of property values. The County Cartographer, if the county has one, resides within the Appraiser's Office. In Kansas, it is not uncommon for four to five counties to share a single appraiser through an informal partnership.

4) Treasurer

One of the primary functions of the Treasurer's Office is the collection of property tax on real estate, business, other personal property, and intangibles.

5) Property Valuation Division, Kansas Department of Revenue

The Kansas Property Valuation Division “exercises general supervision over ad-valorem policies and procedures, conducts the valuation of state appraised properties and provides concise and timely property tax information.”⁶ The PVD’s Cartography Section⁷ works closely with county appraisers. Cartography provides technical assistance and offers educational opportunities on property ownership mapping. In addition, this office creates and maintains GIS and participates in state GIS activities and coordination. Finally, Cartography supplies thematic maps, such as Total Property Value Per Capita and Total Property Ad Velorum Tax by County, to PVD associates and others.

The PVD is in the process of developing a new CAMA system, under the direction of the New Change Control Committee. While this effort is on hold for the moment, it is scheduled to resume sometime in the spring of 2003.

Also of interest, PVD has surveyed counties every year for the last four years to assess the status of property ownership mapping in the state. Survey questions address GIS use, the extent of parcel mapping, coordinate systems, survey section corners, and aerial photography.

6) State GIS Director, State GIS Coordinator and the Kansas Information Technology Office (KITO)

The Kansas Information Technology Office (KITO), within the Division of Information Systems and Communications, under the Kansas Department of Administration is the official lead agency for statewide GIS initiatives.⁸ The State GIS Director and State GIS Coordinator provide staff support for the Kansas Geographic Information System Policy Board and are responsible for the coordination, information dissemination, and development activities of the GIS Policy Board and the Technical Advisory Committee (TAC).

7) Kansas Geographic Information Systems (GIS) Policy Board

In 1989, Governor Mike Hayden established the Kansas Geographic Information Systems (GIS) Policy Board⁹ to oversee the Kansas GIS Initiative. Subsequent governors reaffirmed the GIS Policy Board’s existence, including Governor Joan Finney in 1993 and Governor Bill Graves in 1995. However, in 2000, Governor Graves’ Executive Order #95-180 was repealed and replaced with Executive Order #2000-07.¹⁰ Under this new executive directive, the Kansas GIS Policy Board is “responsible for the development of standards, strategies, and policies that emphasize cooperation and coordination among agencies, organizations, and government entities in order to maximize the cost effectiveness of GIS by creating public and private partnerships throughout Kansas.” The primary purpose of the GIS Policy Board, however, is “to save Kansas taxpayers dollars by making state and local entities more efficient and effective.”

⁶ The Kansas Department of Revenue Property Valuation Division website is <http://www.ksrevenue.org/pvd.htm>.

⁷ The KDOR PVD Cartography website is <http://www.ksrevenue.org/pvdcart.htm>.

⁸ The Kansas Information Technology Office (KITO) website is <http://da.state.ks.us/kito>.

⁹ The Kansas GIS Policy Board website is <http://da.state.ks.us/gis/>.

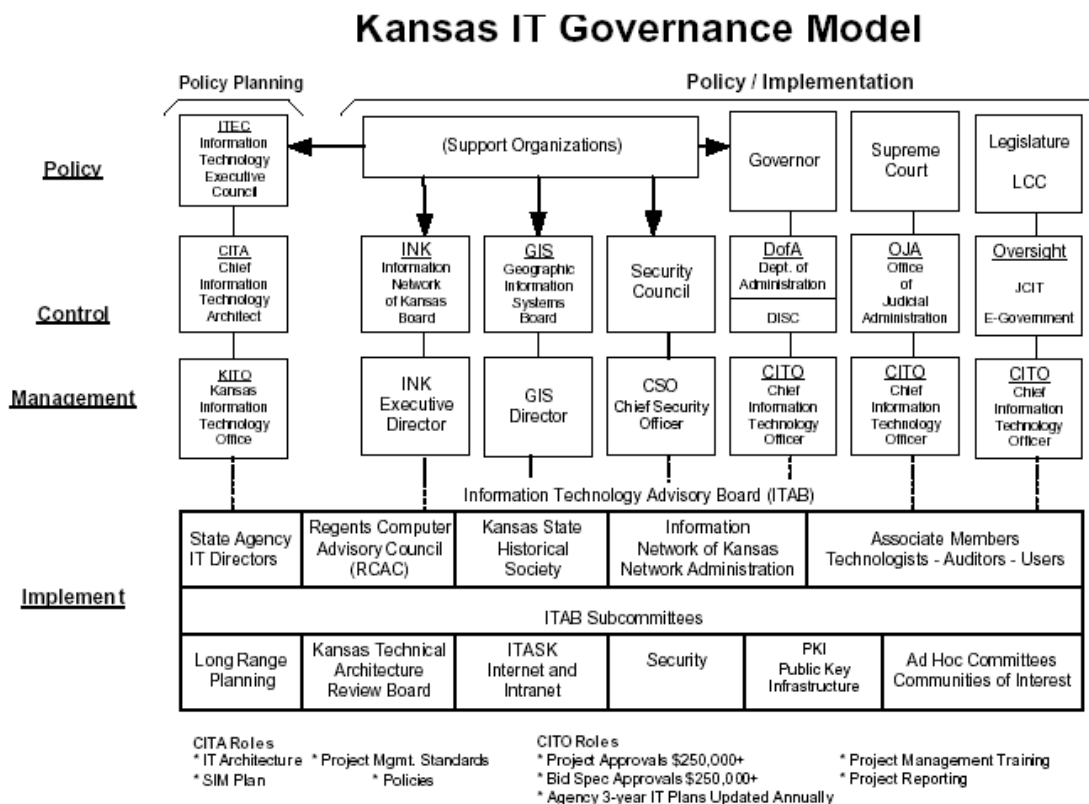
¹⁰ Executive Order 2000-07 may be found at <http://da.state.ks.us/gis/execorder.pdf>.

As depicted in Figure 1: Kansas IT Governance Model, the GIS coordination model is integrated into the overall information technology (IT) governance model.¹¹ The GIS Policy Board, for administrative purposes, is housed within the Kansas Information Technology Office (KITO), a part of the Division of Information Systems and Communications, within the Kansas Department of Administration. The Board receives staff support from the State GIS Director and State GIS Coordinator. As a standing advisory committee to the Information Technology Executive Council, the Kansas GIS Policy Board must provide a copy of its annual report to the Council, as well as to the Governor and Legislature.

The Board's 27 members are appointed by the Governor and are drawn from federal, state and local government agencies as well as the private sector and academic institutions. Sixteen of its members are statutorily designated and represent various state agencies. The remaining eleven members, who serve four year terms, are selected from local government (5), including cities and counties; from Regents institutions (2); from the private sector (3); and from relevant statewide business or professional organizations (1).

The Technical Advisory Committee (TAC), which advises the GIS Policy Board, is responsible for identifying data development issues, needs and requirements, for making recommendations on funding different GIS related projects, and for participating in the development of standards.

Figure 1: Kansas IT Governance Model



¹¹ For the IT Governance model, visit <http://da.state.ks.us/kito/Documents/ITGovernance.pdf>.

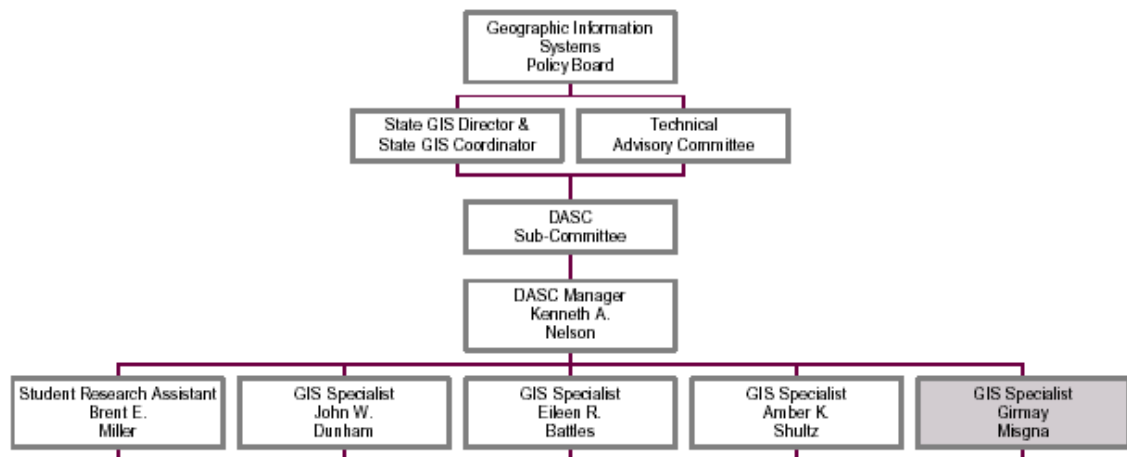
8) Kansas GIS Data Access & Support Center (DASC)

Created by the GIS Policy Board in 1991 and located in the Kansas Geological Survey at the University of Kansas, the Data Access and Support Center (DASC)¹² serves as the central warehousing and distribution center for the Kansas GeoDatabase, a core GIS database developed as part of the Kansas GIS Initiative. DASC's organizational structure is depicted in Figure 2: DASC FY02 Organizational Structure. DASC has five primary functions associated with maintaining the Kansas GeoDatabase and with supporting GIS technology, including:

- "Receive, archive, and catalog all databases.
- Maintain associated documentation.
- Check and verify integrity of data to ensure they meet GIS Policy Board's database standards.
- Convert and transform databases to varying software formats and computer architectures.
- Distribute databases as requested and handle inquiries for DASC services.
- Promote and assist the use of the database and GIS technologies and produce the State GIS Newsletter."

While DASC's primary role is to serve the member agencies of the GIS Policy Board, it also assists all other governmental and public organizations as a State service. Secondary services are provided to all agencies and organizations on a fee-for-services basis as time and resources permit.

Figure 2: DASC FY02 Organizational Structure¹³



¹² The Data Access and Support Center (DASC) website is <http://gisdasc.kgs.ukans.edu/>.

¹³ DASC FY02 Annual Report, p. 5 found at: http://gisdasc.kgs.ukans.edu/gishelp/docs/ann_rpt/annrpt02.pdf.

9) Kansas Department of Transportation (KDOT) Bureau of Transportation Planning, Cartography/GIS Unit

As part of the GIS Strategic Plan (2000),¹⁴ the Cartography/GIS Unit¹⁵ is tasked with recompiling and enhancing the KDOT GIS basemap using 1:12,000 digital orthophotos quarter-quad maps so as to facilitate integration with other Kansas GIS programs. The GIS basemap will be expanded from the current 10,000 mile system to incorporate 99,360 miles of local roads in Kansas.¹⁶ In addition, a location referencing method will be applied to the local roads to locate features along these roads (e.g. accident locations).

At present, addressing standards are voluntary. While KDOT works closely with county engineers, it is collecting neither local data sets nor address ranges at this time. A plan to do so, however, is currently under development.

10) Kansas Association of Mappers (KAM)

The Kansas Association of Mappers (KAM)¹⁷ formed concurrently with the statewide reappraisal program in 1986. Membership, which totals over 200, consists of various mapping and GIS professionals from the federal, state and local government, the private sector and academic institutions. KAM operates under a constitution and a set of by-laws. The Executive Board administers the business of the association, while nine standing committees support its activities. These committees include Awards; Certification; Education; History; Legislation; Library; Membership; Program; and Publication.

The Certification Committee, which is appointed by the President of KAM, administers two designation programs: the Kansas Mapper (KM) designation for “experienced practitioners who are currently working in some aspect of the mapping field” and the Professional Kansas Mapper (PKM) designation for “those professionals who are engaged in the use, production or maintenance of cadastral maps.” The Certification Committee sets program requirements, screens all applicants, administers examinations, and recommends individuals to the Executive Board to receive these designations.

11) Kansas County Appraiser’s Association (KCAA)

Established in 1966, the Kansas County Appraiser's Association (KCAA)¹⁸ is governed by an Executive Board, which consists of the president, president-elect, vice-president, and the immediate past president of the Kansas County Appraiser’s Association, as well as six members from each of the six Regional Kansas County Appraisers Associations. The objectives of the KCAA are “to improve the standards of appraisal practice; to provide a clearing house for the collection and distribution of useful information relating to appraisal practice; to

¹⁴ The 2000 KDOT GIS Strategic Plan can be found at:
<http://kdot1.ksdot.org/public/kdot/burtransplan/prodinfo/acccstat/kdotfinal.pdf>.

¹⁵ The Cartography/GIS Unit of KDOT is found at
<http://kdot1.ksdot.org/public/kdot/burtransplan/burovr/cartogisuT.html>.

¹⁶ This includes the addition of the 34,176 miles of FHWA Functional Classification roads through minor collector (non-state system).

¹⁷ The Kansas Association of Mappers (KAM) website is <http://www.kam.to/Default.htm>.

¹⁸ The Kansas County Appraiser's Association (KCAA) website can be found at
<http://www.accesskansas.org/kcaa/index.htm>.

educate the taxpaying public on the true nature and importance of the work performed by appraisal officers; and to engage in research and publish the results of studies; to elevate the standards of personnel requirements in appraisal offices; to elevate the other public and private agencies interested in providing tax administration; and in every proper way to promote justice and equity in the distribution of the tax burden.” In addition, the Institute of Certified Kansas Appraisers, a not for profit corporation run by the KCAA, provides training, education, certification, and designation of Kansas ad valorem appraisal personnel.

12) Kansas Register of Deeds Association (KRDA)

13) Kansas Association of Counties (KAC)

Founded in 1975, the Kansas Association of Counties (KAC)¹⁹ is a quasi-public agency that serves county government by providing legislative representation, by offering technical assistance, by fostering model practices and programs, and by supplying leadership and professional education. Both the Kansas Register of Deeds Association and the Kansas County Appraiser’s Association are affiliates of KAC.

14) Kansas Society of Land Surveyors (KSLS)

Founded in 1957, the Kansas Society of Land Surveyors²⁰ actively promotes “the common good and welfare of members engaged in the practice of Land Surveying” by fostering “high standards of professional ethics and practice” and by providing and encouraging educational and training opportunities for its members.

b. Control Structures

1) Policies

a) Geographic Reference Framework

In Kansas, the Public Land Survey System (PLSS) serves as the cadastral reference grid to which land rights features and attributes are linked. There is no statewide coordinated remonumentation program at this time.

Geodetic control allows for the determination of feature locations referenced to a common, nationally-used horizontal and vertical coordinate system and provides the basic reference framework for spatial data integration. To a limited degree, there is some state level involvement in coordination of the densification of geodetic control points, referenced to the National Spatial Reference System maintained by the National Geodetic Survey (NGS).

b) Parcel Specific Information

As described above, between 1985 and 1989, Kansas conducted a statewide reappraisal and classification program, mapping over 1,422,000 parcels and generating a complete and comprehensive set of property ownership maps for every county in the state [K. S. A. 1987 Supp. 79-1476 et. seq.]. The

¹⁹ The Kansas Association of Counties (KAC) website is <http://www.kansascounties.org/index.asp>.

²⁰ The Kansas Society of Land Surveyors’ website is located at <http://www.ksls.com/>.

resulting Mylar property ownership maps were comprised of cadastral and soil overlays and were compiled over rectified aerial photographic enlargements²¹ on 4 or 2 mil double matte polyester film. Each parcel was assigned a parcel identification number.²² Land use identifiers, such as agricultural use value, also are included along with soil type.

The reappraisal effort was a joint initiative by both county and state governments. In addition to offering education and technical support, the Department of Revenue Property Valuation Division (PVD) provided guidelines, which specified how mapping should be conducted and what information should be displayed. Counties, on the other hand, were responsible for acquiring or creating property ownership, agricultural use and soil overlays. While the majority of counties contracted for mapping services, ten decided to conduct the mapping in-house.

The statewide Computer Aided Mass Appraisal (CAMA) program sprung from this 1989 reappraisal initiative. Providing most of the financial support, the PVD enforced uniformity in the initial creation of the property ownership maps and CAMA. Over time, however, as GIS and other processes have evolved, the PVD has adopted a somewhat different approach and accommodates some variance between counties.

The old CAMA system is based on a flat file structure, which is not compatible with GIS. Therefore, at the county level, the CAMA system and GIS may not be linked. Currently, the KDOR PVD, in cooperation with the Kansas County Appraiser Association (KCAD), is in the process of developing a new CAMA system. While this effort has been on hold temporarily, PVD will be posting a request for quotations in the near future.²³

The Kansas GIS Policy Board does not require that counties file their spatial data assets with the state. Furthermore, there is no coordinated effort for collecting parcel information at the state level. Thus, at present, no statewide parcel layer exists nor is it likely to be automated in the near future. A parcel centroid database, however, is considered a priority by the State GIS Director's Office and may be developed at some point in the future.

Finally, if statewide coordination of general deed recording automation (document imaging and indexing) exists, it is not occurring in cooperation with GIS Policy Board or with the DOR PVD.

²¹ Aerial photographs were acquired in the winter and spring of 1996 with a 6" focal length lens from an altitude of 12,000 feet (1:24,000). Urban areas were acquired from an altitude of 3,000 feet (1:6000). Kansas property ownership maps and enlargements are depicted at four different scales depending on parcel density: 1"=400', 1"=200', 1"=100' and 1"=50'.

²² See Basic Mapping Course Book (Technical Specifications for Property Ownership Mapping) Chapter 1 at <http://www.ksrevenue.org/pvd.htm>.

²³ See Department of Administration Request for Quotations website: <http://da.state.ks.us/purch/rfq/>

c) Kansas Geographic Information Systems (GIS) Initiative

The GIS Policy Board's Strategic Management Plan for GIS Technology identifies numerous GIS policies.²⁴ This plan focuses on four strategic areas: Database, Services, Management, and Information Access.

d) Orthophotography

One effort of particular note is the Kansas Statewide Aerial Photography Base Mapping Project.²⁵ The Kansas Information Technology Office (KITO), acting in its role as the implementation arm of the Kansas GIS Policy Board, sponsored the proposal for the acquisition of an updated statewide Digital Orthophoto 3.75 minute Quarter Quadrangle (DOQQ) coverage, to be collected and processed in black and white to one meter ground resolution. Work on this project has been underway for three years and will be completed in July 2004.

2) Legal Framework

As stated earlier, Governor Bill Graves issued Executive Order No. 2000-07 in October 2000 delegating GIS development and coordination responsibilities to the GIS Policy Board and to the Kansas Information Technology Office. This order also expands local representation on the GIS Policy Board (Warnecke 2002).²⁶

The statewide reappraisal effort of the mid-1980s was promulgated by K. S. A. 1987 Supp. 79-1476 et. Seq. More recent legislation includes SB 564,²⁷ which as of July 2002, requires all county register of deeds offices to charge additional recording fees of \$2 per page for deeds, mortgages, and other instruments of writing, including a release or assignment of real estate mortgages. This bill was requested by the Johnson County Register of Deeds; however, the Kansas County Register of Deeds Association, the Kansas Land Title Association, and the Kansas Title Insurance Corporation recommended that the bill be applied uniformly throughout the state.

The additional fee would be transferred to a register of deeds technology fund, established by county commissions, to be used for acquiring equipment and services for storing, recording, archiving, retrieving, and handling data stored or recorded in the register of deeds office.

3) Funding and Costs

Kansas spent approximately \$18.2 million on the statewide reappraisal program in 1986-1989, or roughly \$12.80 per parcel.²⁸

²⁴ State of Kansas Strategic Management Plan for GIS Technology, July 1997, can be found at <http://gisdasc.ks.ukans.edu/dasc/docs.html>.

²⁵ Aerial Photography Base Mapping Project website: <http://da.state.ks.us/gis/DOQQProject.htm>

²⁶ Executive Order #2000-07 can be found at <http://da.state.ks.us/gis/execorder.pdf>.

²⁷ SB 564 <http://www.kslegislature.org/bills/2002/564.pdf>

²⁸ Kansas Basic Mapping Course Book, Chapter 1, p. 3. "On a per parcel basis, costs for the reappraisal maps were as follows: Compilation \$7.55; Drafting \$1.50; Administration \$0.75; Aerial Photos \$1.50; Soil Overlays \$1.50; Total per parcel cost \$12.80. ...The county with the fewest [parcels] is Wallace at 2,779. On the average, there are approximately 14,140 parcels per county."

Currently, no state funding is specifically designated for geospatial data development and coordination. At present, funding for database development projects largely comes from the Kansas Water Plan. The State GIS Director's Office staffing and administration costs, as well as clearinghouse site (DASC) expenses, are funded through a computer rate-based charge to state agencies that use the central computer system.

Since FY 1991, fiscal support for the overall GIS program has come from the State Water Plan special revenue fund, through the Kansas Water Office (KWO), which has provided a quarter million dollars for limited database development. The GIS Policy Board, along with the Technical Advisory Committee and KITO, administers this yearly grant awards program.

The Kansas Water Office and the Department of Administration Division of Information Systems and Communications (DISC) support the Kansas Data Access and Services Center (DASC) activities, contributing \$238,880 to the FY02 budget. In addition, the Kansas Geological Survey (KGS) furnishes over \$60,000 annually, providing half-time salary support for the DASC manager and covering overhead operation costs such as office space, telecommunications, and use of KGS vehicles.²⁹

DASC actively pursues external grant opportunities. During FY01, DASC received a grant from the Information Network of Kansas (INK) Board of Directors to launch a new Internet Map Services (IMS) initiative. DASC also continued work on the Kansas Collaborative Research Network (KanCRN) project, and the Kansas State Historical Society (KSHS) Archeological Spatial Data.

The Kansas Aerial Photography Base Mapping Project's \$1.2 million dollar cost is funded jointly by contributions from KDOT federal matching funds, the Kansas GIS Policy Board Data Development Funds, support from the US Natural Resources Conservation Service (NRCS), the Kansas Information Technology Office, and the US Department of Agriculture. These images will be available to communities upon request with minimal charge so as to leverage local projects and parcel mapping efforts. It is hoped that updates will occur on a 3-5 year cycle, with the incorporation of higher resolution products where needed, depending on feasibility and local coordination.

The DOR offers revenue sharing for network availability, for the licensing of CAMA data, and for the development of digital infrastructure.

4) Standards

In the summer of 1995, GIS professionals and organizations convened to identify processes for developing and maintaining standards. This forum led to the formation of the Kansas GIS Standards Task Force, under the GIS Technical Advisory Committee of the GIS Policy Board. Membership includes representatives from the Kansas GIS Policy Board, the Board's Technical Advisory Committee, the Kansas Association of Mappers, the Kansas Association of Counties, the League of Municipalities, the County Clerks Association, the County Appraisers Association, the County Highway Association, the County Planning

²⁹ DASC FY02 Annual Report: http://gisdasc.kgs.ukans.edu/gishelp/docs/ann_rpt/annrpt02.pdf

and Zoning Association, the Government Information Sciences Association, and other public and private sector organizations.

The following year, the Kansas GIS Standards Task Force and the Geodata Compatibility Guidelines Working Group hosted a second forum, which produced a standards development and adoption process.³⁰ Since this time, standards have been developed and/or adopted for addressing, administrative boundaries, cadastral, digital orthoimagery, elevation data, geodetic control, hydrography, transportation and metadata.

To the extent possible, the Kansas GIS Cadastral Standard integrates existing standards where applicable, including the Kansas Geodata Compatibility Guidelines, the Kansas GIS Metadata Standard, the Kansas Department of Revenue-Division of Property Valuation Technical Mapping Specifications, the FGDC Cadastral Data Content Standard for the National Spatial Data Infrastructure, and other spatial data standards. The current GIS Cadastral Standard is limited in detail, however, as local governments wanted technical guidelines, not strict requirements.

The Kansas Geospatial Data Addressing Standard³¹ provides a framework for the development of a reliable master street address file. The Addressing Standard standardizes the entities related to addresses, such as street directions and street types. In addition, the Addressing Standard handles geospatial features such as points, polygons, and lines (i.e., street centerlines), and facilitates geocoding. This standard also discusses common practices for assigning address numbers and street names.

The content of the remaining standards also may be based to some degree on work being conducted at the federal level through the Federal Geographic Data Committee (FGDC) and the National Spatial Data Infrastructure (NSDI) initiative. Of particular concern, however, is the uncertainty generated by the national standard setting process. Standards being developed in Kansas need to address national standards in order to ensure compatibility with federal spatial data. Nevertheless, questions emerge concerning the suitability of national standards for addressing Kansas' unique circumstances and data needs and whether adjustments should be made to these standards.

The Kansas GIS Metadata Standard, adopted in 1996, is mandated to apply to all GIS data at state agencies and academic institutions. Local compliance, however, with GIS Policy Board standards is voluntary. The Kansas GIS Policy Board does not exert any pressure on local governments to adopt the Board's spatial data standards.³² Rather, the Board depends on the active participation of over twenty organizations, representing a broad constituency, in the standards development process as a mechanism for encouraging standards adoption.

³⁰ Kansas Geodata Compatibility Guidelines, State of Kansas GIS Policy Board, Version 2.2. November 1996. <http://gisdasc.kgs.ukans.edu/dasc/docs.html#dasc>

³¹ Kansas Addressing Standard is located at: <ftp://gisdasc.kgs.ukans.edu/gishelp/docs/standards/address.pdf>.

³² Kansas GIS Standards can be found at: <http://gisdasc.kgs.ukans.edu/dasc/docs.html#dasc>.

c. Issues and Opportunities

Under the statewide reappraisal program of 1986-89, the state provided funding for local efforts, and hence, the counties adhered to state technical specifications in the development of their property ownership maps. As state funding diminished, however, the decision as to whether or not to automate parcel mapping has devolved to the counties. Counties, as a result, became more independent as they moved from manual mapping to digital mapping and GIS.

Even so, the program continues to be effective in many ways. The manual maps provide a valuable resource when counties decide to convert to digital parcels. Every parcel of land in Kansas has a unique parcel identifier. In addition, the PVD has noted a 5 to 10 percent increase per year in the number of counties opting to implement digital mapping and GIS. Furthermore, counties now have several digital data sets available to them through the GIS Data Access and Services Center at little or no cost (e.g., DOQQs, SSURGO, PLSS).

Technical impediments to automation are relatively minor. A fair amount of variability exists in the GIS software packages used at the county level, making statewide data integration more difficult. Currently, four proprietary software packages dominate the market. Another stumbling block has been the old CAMA system, which is not compatible with GIS.

Institutional impediments, on the other hand, are more significant. At the local level, impediments include a lack of time and expertise and a strong sense of autonomy. Some counties have experienced significant turnover in trained personnel, although others have sought vendors for technical guidance. More importantly, a formal statewide program for automation is needed along with greater policy and fiscal support at the top levels of state government and perhaps with better enforcement of statutes already in place.

As part of the process of updating the strategic plan, the GIS Policy Board, the State GIS Director's Office, and DASC are going to focus their efforts on building programmatic coordination with local governments using the Internet GIS clearinghouse as a vehicle. Each county government will be provided with 2-6 web pages that they can update and maintain. These web pages will include an inventory of each counties geospatial data assets, metadata, interactive and printable maps, as well as contact information. In addition, the Kansas GIS community will go through another iteration of strategic plan formulation; the final report should be available in May 2003.

Finally, during FY03, DASC intends to assist KITO in coordinating with local governments to archive periodic updates of spatial data layers at DASC and to develop mechanisms for providing secure access to the Emergency Data Repository (EDR) in the event of a disaster.

2. Minnesota

By the late-1980s, use of computerized land records systems and optical imaging systems by Minnesota's recording offices had grown. In 1991, an equipment fund for recorders and registrars established by the Minnesota Legislature enabled recording offices to purchase personal computers, wide- or local-area networks, and document imaging systems. Legislation in 1997 instituted statewide standards for formatting documents filed with county recorders and registrars. Additional legislation to balance recording fees throughout the state passed in both the Minnesota House of Representatives and Senate, but was vetoed by the governor.³³

Over the last decade, county recorders and registrars have supported legislation to strengthen Minnesota's real estate and land record statutes. In 1999, an informal group, initiated by Senator Steve Kelley and Secretary of State Mary Kiffmeyer, convened to study the possibility of electronic real estate transactions. Concurrently, the Minnesota County Recorders' Association (MCRA) passed a resolution that "called for the creation of a broad-based group to study and suggest means to address the increasingly complex relationship that exists among modern land transfer practices, county recording office procedures, and state real estate and recording laws" and urged the Ventura administration to take action. These efforts led to the creation of the Electronic Real Estate Recording (ERER) Task Force under Laws 2000, Chapter 391, which charged the Task Force with the development of a work plan and budget for conducting a study the feasibility of an electronic real estate recording system.

Minnesota was quick to adopt geographic information technology, although GIS was not directly linked to land records related to transactions. As early as the 1960s, the Minnesota Legislature funded the collection of geospatial data as part of the Lakeshore Development Study, a project that addressed the rapid growth occurring around Minnesota's lakes. This effort, in turn, led to an inventory of the entire state and the subsequent creation of the Minnesota Land Information System (MLMIS). In 1977, when the Minnesota Legislature created the Land Management Information Center (LMIC) within the State Planning Agency (SPA) to serve as a data center and project services bureau, MLMIS was moved under its umbrella. Over time, LMIC's focus broadened and LMIC became the de facto lead agency for coordination of GIS activities. Today, several other organizations play a role in GIS coordination, including the Minnesota Office of Technology, the Minnesota Information Policy Board, the Minnesota Governor's Council on Geographic Information (GCGI), MetroGIS, and the Minnesota GIS/LIS Consortium.³⁴

In the second half of the last decade, the Minnesota Governor's Council for Geographic Information developed a statewide model program for land records modernization that, if funded, would support local land records modernization efforts and facilitate statewide integration of local data. Although this program has not been funded to date, it serves as a basis for ongoing discussions and as a starting point for the Minnesota Cadastral I-Team initiative.

³³ Electronic Real Estate Recording Task Force. 2001. Workplan Report to the Legislature. January 15, 2001. Section IV.

³⁴ Arbeit, D. 2001. State Geographic Information and Related Technology (GI/GIS) Profile: Minnesota, June 19, 2001. MN Planning. <http://www.mnplan.state.mn.us/pdf/2001/GISprofile2001.pdf>

a. Administrative Structures/Coordination Structures and Procedures

In Minnesota, land information is collected and maintained locally by a variety of offices, including the Recorder (formerly register of deeds), Registrar of Titles, Auditor, Treasurer, Assessor, County Surveyor, Land Management, Planning and Zoning, Engineer, Public Works, and GIS Departments. In Minnesota, Auditors [MN Statutes Chapter 384] and Recorders [MN Statutes Chapter 386] are elected for a four year term of office.

All 87 counties in Minnesota have recording systems, or *abstract systems*; in addition, many have separate, mutually exclusive *registration systems*, or *Torrens systems*. Unless a property owner takes affirmative steps to register a parcel in the registrar of titles office (i.e., Torrens system), records regarding that parcel are recorded and maintained by the county recorder (i.e., abstract system). Currently, over twenty unique recording systems are in place throughout Minnesota counties.³⁵ For a detailed description of the mechanics of these two systems, please refer to Section V. Minnesota's Land Records Systems in the Electronic Real Estate Recording Task Force's *Workplan Report to the Legislature* (2001).³⁶

For most counties, there is no official coordinator of land information activities. While local parcel data may be digitally mapped, it is rarely linked to any legal documents or various indexes. Only a handful of county recorders actively are promoting integration with GIS. At the present time, there is no legislative authority or coordinated state program to collect local land information.

Minnesota has several organizations that have advocated statewide land records modernization efforts, principally: 1) the Minnesota Governor's Council on Geographic Information (GCGI); (2) the Land Management Information Center (LMIC); 3) the Electronic Real Estate Recording Task Force (ERERTF).

Statewide professional organizations such the GIS/LIS Consortium, the Minnesota Association of Assessing Officer (MAAO),³⁷ and the Minnesota County Recorders' Association (MCRA) also provide guidance, education and training. MetroGIS coordinates data sharing within the seven-county Twin Cities metropolitan area.

The Minnesota Office of Technology and the Information Policy Council (IPC) play a significant role in guiding statewide implementation of technology, especially in relation to standards and infrastructure.

Major state landowners and administrators, and hence key custodians for parcel information, include the Minnesota Department of Natural Resources, which manages 90-95% of state owned lands (5.3 million acres), the Minnesota Department of Transportation, the Department of Military Affairs, and the University of Minnesota. In fact, the state owns 5.6 million acres in total and is the third largest land owner in the nation. Federal agencies own and manage 3.4 million acres within Minnesota. Major federal land owners include the U.S. Forest Service (USFS) (2.8 million acres), the

³⁵ ERERTF. 2002. ERERTF Business Analyst Services Project Cost Benefit Analysis. May 30, 2002. p. 5

³⁶ Electronic Real Estate Recoding Task Force. 2001. Workplan Report to the Legislature. <http://www.commissions.leg.state.mn.us/lcc/workplan.pdf>

³⁷ MAAO website: <http://www.mnmaao.org/index.htm>

Bureau of Land Management (BLM), the Fish and Wildlife Service, the National Park Service, and the Army Corps of Engineers. In addition, the Farm Service Agency (FSA) maintains parcel boundary information to support its local programs. Finally, Indian Nations and Tribes own more than 1.0 million acres within Minnesota.³⁸ The creation of a statewide parcel layer will require coordination with all these agencies.

1) Assessor

The Assessor's Office is responsible for the valuation and classification of real and personal property, property appraisals, and maintaining parcel information such as lot size, property and building value, and property description. The Assessor also reviews local assessment books, prepares abstracts, maps and other forms prescribed by the State Commissioner of Revenue.

2) Auditor/Treasurer

The Auditor/Treasurer is responsible for investing county funds according to state statutes and securing collateral to protect county funds. In addition, the Auditor/Treasurer deposits all money that comes in and keeps record of all disbursements, prepares monthly trial balances of the various accounts, keeps the Auctioneer Bonds on file, collects all current taxes, real estate, mobile homes and personal property, and maintains records of people's escrow accounts. In some cases, the Auditor conducts all county and state elections, documents all land transfers, splits and combinations, and handles many of the duties necessary for the tax forfeited lands administration. The Auditor's Office provides supervision for the License Bureau [Minnesota Statutes § 384.01 – 384.19].

3) Recorder

The Recorder's Office is the office of record for all permanent records pertaining to real estate. All documents, such as deeds, mortgages, contracts, mortgage releases and official plats of land are recorded in this office. As a satellite office of the Secretary of State, the Recorder handles the filing of financing statements on a statewide computer system: birth, death and marriage records, issuing certified or non-certified records of birth, death & marriages, processing marriage license applications, passport applications, driver license renewals, notary public registration, and updating and creating abstracts [Minnesota Statutes § 386.001 – 386.78, § 507.01 – 507.47].

Under Minnesota law, the grantor-grantee index is the official index for abstract property. Counties also may establish and maintain tract indexes, and most have, but they are not required to do so under Minnesota law.

4) Registrar of Titles

Under Minnesota Statutes § 508.30, county recorders shall be registrars of titles in their respective counties. All documents similar to the ones listed above for the recorder that are related to the Torrens system are filed with the Registrar of Titles [Minnesota Statutes § 508.001 – 508.84, § 508A.01 – 508A.85].

Under Minnesota Statutes § 386.07, the county recorder in any county in which the population is 400,000 or over, and "in which the business of the registrar of titles is conducted in a separate place from that of the county recorder, shall provide a

³⁸ GCGI. 2003. Minnesota Cadastral I-Plan. Version 1.1. January 6, 2003.

tract index of all lands registered under what is known as the Torrens System of land titles, and the same shall be kept in the office of the county recorder in any such county for the use of receiving clerks in checking the properties listed therein with the properties described in the instruments presented for record [HIST: (877-2) 1927 c 376 s 1; 1976 c 181 s 2].”

5) Surveyor

The duties of a county surveyor include any of the duties involved in the practice of land surveying as provided in Minnesota Statutes chapter 326 [Minnesota Statutes § 389.01 – 389.09]. Roughly half of Minnesota’s counties have full-time county surveyors.

6) Electronic Real Estate Recording Task Force (ERERTF)

Created in August 2000 under Minnesota Laws 2000, Chapter 391, the Electronic Real Estate Recording Task Force (ERERTF) was first tasked with presenting a work plan and budget for studying the feasibility of an electronic filing and recording system. The ERERTF submitted this work plan to the legislature in January 2001.³⁹ Currently, the task force is in the process of studying and developing recommendations regarding implementation of a system for electronic filing and recording of real estate documents. The task force is scheduled to sunset on June 30, 2004.

7) Office of Technology (OT), Minnesota Department of Administration

Established in 1997, the Minnesota Office of Technology (OT)⁴⁰ is mandated under Minnesota Statute § 16E.01 to provide leadership and direction for information and communications technology policy in Minnesota. As geographic information is a critical component of information technology, agency geographic information investments are subject to OT review. Official GIS standards and guidelines for the state of Minnesota can be found at the Minnesota Office of Technology.

8) Information Policy Council (IPC), Minnesota Department of Administration

This Information Policy Council (IPC) originally was established under Minnesota Statutes, 16B.41, Subdivision 2, although this legislation was later repealed. Today, the IPC is mandated by legislation for the Office of Technology to "encourage cooperation and collaboration among state and local governments in developing intergovernmental communication and information systems [1997 Chapter 202 Article 3, Section 7 Subd. 3].” Comprised of the chief information officers from Minnesota’s state agencies and other quasi-agency organizations, the Information Policy Council (IPC) “advise[s] the Assistant Commissioner of the Office of Technology and the Commissioner of Administration concerning matters related to the statutory responsibilities of integrating and operating the state’s information resource facilities, developing plans and programs for information systems, and providing leadership and services in related information resource efforts.”

³⁹ Electronic Real Estate Recoding Task Force. 2001. Workplan Report to the Legislature. <http://www.commissions.leg.state.mn.us/lcc/workplan.pdf>

⁴⁰ Minnesota Office of Technology website: <http://www.state.mn.us/cgi-bin/portal/mn/jsp/home.do?agency=OT>

The Minnesota Governor's Council on Geographic Information (GCGI) worked closely with the IPC and the Department of Administration to develop a standards review process,⁴¹ which the GCGI now follows to develop and adopt standards and guidelines related to geographic information and geographic information technology.⁴²

9) Minnesota Governor's Council on Geographic Information (GCGI)

Created in 1991, the Governor's Council on Geographic Information (GCGI)⁴³ provides advice and support for the coordination of activities, policies, and investments regarding the development and use of geographic data and geographic information technologies at all levels of government within Minnesota. The Council's leadership role was reaffirmed by Executive Order 93-17 and again by Executive Order 99-6.

The Council is comprised of 18 voting members plus ex-officio members that represent the GIS/LIS Consortium, the Land Management Information Center, the Office of Technology, the Minnesota Legislature and the U.S. Geological Survey. The Director of the Office of Strategic and Long-Range Planning appoints the Council's voting members, who represent federal, state, and local government, as well as academic institutions and the private sector.

Through April 6, 2003, when the current executive order expires, the Office of Strategic and Long-Range Planning (Minnesota Planning) has provided administrative staff support for the Council, whereas the Land Management Information Center provides technical staff support. After April 23, 2003, Minnesota Planning functions, including LMIC, will be reorganized within the Department of Administration. The Commissioner of Administration has recommended reauthorization of the Council.

Several committees provide support for GCGI, including Data, Land Records Modernization, Hydrography, Outreach, and GIS Standards. The Data Committee is tasked with developing recommendations on intergovernmental agreements for data sharing and integration and with coordinating the efforts of state Implementation Teams (I-Team).

10) Land Management Information Center (LMIC), Minnesota Department of Administration

Created in 1977 and promulgated under Minn. Stats. § 4A.05, the Land Management Information Center (LMIC)⁴⁴ serves as the de facto lead agency for coordination of statewide geographic information technology and data development. The LMIC

⁴¹ IPC Proposed Process for Developing Policies, Standards and Guidelines: <http://www.state.mn.us/intergov/ipc/resources/propmsg.html>

⁴² Arbeit, D. 2001. State Geographic Information and Related Technology (GI/GIS) Profile: Minnesota. June 19, 2001. MN Planning, LMIC.

⁴³ Governor's Council on Geographic Information website: <http://www.gis.state.mn.us/about.htm>

⁴⁴ LMIC website: <http://www.lmic.state.mn.us>

- “Identifies data needs, promotes standards, develops and integrates data, serves as a state archive, provides geographic data to the public, and offers data, maps and other visualization services over the Internet;
- Consults with clients to design and implement projects that use geographic information technology to meet mapping, analysis, planning and decision-making needs; and
- Conducts research, development and evaluation of geographic information technology and promotes the transfer of effective geospatial technology in Minnesota.”

In addition, LMIC coordinates implementation of the Minnesota Geographic Data Clearinghouse,⁴⁵ which serves as an FGDC clearinghouse node and which provides a link to the Minnesota GeoGateway, enabling comprehensive searches of all nodes of interest to Minnesota.

LMIC provides staff support for the Minnesota Governor’s Council on Geographic Information. On April 23, 2003, LMIC will move from the Minnesota Office of Strategic and Long-Range Planning (MN Planning) to the Minnesota Department of Administration.

11) Minnesota Legislative GIS Office and Subcommittee of GIS

Originally established to support the 1990 redistricting effort, the GIS Office⁴⁶ provides the Legislature and the Office of the Secretary of the State with timely, accurate spatial data and maps for legislative use. In addition, the GIS Office serves as the repository of statewide boundary information for legislative use and provides the software, hardware, and staff resources necessary for Redistricting after each decennial census.

12) Division of Lands and Minerals, Minnesota Department of Natural Resources (DNR)

In addition to managing the state’s mineral resources, the Division of Lands and Minerals⁴⁷ of the Minnesota Department of Natural Resources handles real estate acquisitions, sales, and exchanges and manages leasing of state lands. To this end, the Division maintains surface and mineral land records for state-owned lands administered by the DNR.

13) Minnesota Department of Transportation (Mn/DOT)

Through a practice known as “spotting titles,” which is performed to check ownership and to identify gaps and overlaps in legal descriptions, the Mn/DOT generates parcel data that is used for highway planning and design, right-of-way acquisition and land management, and road construction and maintenance.⁴⁸ This data is available for use by other organizations.

⁴⁵ MN Geographic Data Clearinghouse website: <http://www.lmic.state.mn.us/chouse/index.html>

⁴⁶ <http://www.commission.leg.state.mn.us/gis/html/aboutgis.html>

⁴⁷ http://www.dnr.state.mn.us/lands_minerals/index.html

⁴⁸ Theroux, A. and Craig, W. 2002. A Statewide Parcel Map Inventory in Progress. GIS/LIS News. Fall 2002. www.mngis.org/newsletter/fall2002.pdf

The Mn/DOT Office of Land Management⁴⁹ makes the following parcel related information available:⁵⁰

- “Geodetic Survey Control: A database of statewide information on permanent geodetic control marks of horizontal and vertical position;
- Field Survey Data: Mn/DOT’s district Survey offices maintain field survey data on boundary, centerline, and right-of-way location and associated monumentation activities;
- Right-of-Way Plats: Recorded documents depicting proposed right-of-way acquisition that delineate boundaries, monumentation and related right-of-way parcel data;
- Final Right-of-Way Maps: Maps that graphically display information pertaining to the final boundaries and right-of-way extents following completion of a road project;
- Parcel File Data: A collection of important documents relating to and supporting acquisition of the parcel, [such as] certificate of surveys, appraisal data, attorney’s certificate of title, instruments of conveyance, well information, photographs, parcel sketch, and field title report...;
- State of Minnesota base map: A map derived from the digitized “skeletal quad” files (1:24,000 scale)...;
- Corporate Boundary Maps...”

The Mn/DOT’s Basemap is a 1:24,000-scale collection of statewide GIS data layers that include the road systems, administrative boundaries, railroads, and surface waters.

14) MetroGIS Project

Serving the seven-county Minneapolis-St. Paul metropolitan area, MetroGIS⁵¹ is voluntary collaboration of local and regional governments whose mission is “to provide an ongoing, stakeholder-governed, metro-wide mechanism through which participants easily and equitably share geographically referenced data that are accurate, current, secure, of common benefit and readily usable.” The Metropolitan Council, other regional agencies, and nearly 300 counties, cities, school districts, and water management organizations participate in MetroGIS, as well as state and federal agency partners.

The MetroGIS Policy Board, which provides policy direction and guidance, is comprised of twelve elected officials drawn from each of the seven metropolitan counties, the Association of Metropolitan Municipalities (AMM), the Metropolitan Chapter of the Minnesota Association of Watershed Districts (MAWD), the Technology Information Educational Services (TIES - school districts), and the Metropolitan Council. The Board is supported by a Coordinating Committee, which in turn is supported by the Technical Advisory Team.

⁴⁹ Mn/DOT Office of Land Management website: <http://rocky.dot.state.mn.us>

⁵⁰ Minnesota Department of Transportation Survey & Land Management Information brochure: http://rocky.dot.state.mn.us/lis_brochure.pdf

⁵¹ MetroGIS website: <http://www.state.mn.us/intergov/metrogis/> See also MetroGIS 2003-2005 Business Plan, Adopted October 22, 2002. http://www.metrogis.org/about/business_planning/bplan_0305.pdf

MetroGIS also received designation as an I-Team, in conjunction with the national I-Team GeoSpatial Information Initiative, a joint effort of the Federal Office of Management and Budget (OMB) and the Federal Geographic Data Committee.

Of note, MetroGIS coordinates the assembly of parcel data produced by the seven counties in the Minneapolis-St. Paul Metropolitan Area and distributes the resulting regional parcel data set to the MetroGIS community. For more information about this dataset, refer to the *MetroGIS 2003-2005 Business Plan* (2002).⁵²

Through a public-private partnership between the Metropolitan Council, MetroGIS, Mn/Dot, and the Lawrence Group (TLG), the Metropolitan Council is able to distribute TLG's Regional Street Centerline dataset to state and local government agencies as well as to academic institutions in the State of Minnesota at no cost to the recipients. This data set, which is owned and regularly updated by TLG, was developed for use in automated routing, address matching and other GIS applications. Street centerlines have been realigned to approximate the centerlines found in MetroGIS's parcel database and orthoimagery. The Lawrence Group is extending this dataset into 21 of Minnesota's counties.⁵³

15) Minnesota GIS/LIS Consortium

Established in 1988, the Minnesota GIS/LIS Consortium⁵⁴ is a non-profit professional organization of over 600 professionals from local, state and federal government agencies, the private sector, and academic institutions. The MN GIS/LIS Consortium publishes GIS/LIS News three times a year, organizes and conducts an annual conference, prepares surveys addressing issues concerning the GIS/LIS community, and sponsors various workshops and training opportunities.

b. Control Structures

1) Policies

a) Geographic Reference Framework

(1) Public Land Survey System (PLSS)

In Minnesota, the Public Land Survey System (PLSS) serves as the structure around which all legal descriptions of land parcels are based. Several agencies, including LMIC, DNR, and Mn/DOT, maintain information on the PLSS.⁵⁵

The existing PLS data sets can be grouped into three categories: point, line and polygon.

⁵² *MetroGIS 2003-2005 Business Plan* (2002)

http://www.datafinder.org/metadata/metrogis_regional_parcel.htm

⁵³ http://www.metrogis.org/data/datasets/street_centerlines/index.shtml

⁵⁴ GIS/LIS Consortium: <http://www.mngislis.org>

⁵⁵ In the 1999 *Status Report: Priority GIS Data*,⁵⁵ the Minnesota Governor's Council on Geographic Information Data Committee Workgroup highlighted the need for a single high resolution PLS layer. Minnesota Governor's Council on Geographic Information Data Committee Workgroup. 1999. Status Report: Priority GIS Data. July 16, 1999. <http://www.mnplan.state.mn.us/pdf/1999/lmic/draft.pdf>

Point data sets include:

- LMIC SECTIC-24K Section Corner Database, which includes coordinates for all PLS section corners within Minnesota recorded from the U.S. Geological Survey's 1:24,000-scale 7.5-minute topographic quadrangle map series;
- Mn/DOT Basemap PLS Layer, which contains a point layer for PLS section corners, but no attributes; and
- Control Point Inventory, which is a repository database system of the public land survey corners for the state of Minnesota. Originally developed by the DNR and based on SECTIC coordinates that were converted from NAD27 to NAD83, the Public Land Survey Control Point Inventory has been updated and is now maintained by the Mn/DOT as a client-server database system accessible via the Internet. Additional information has been added, including the data and surveyor of the original PLS, and a direct link to the scanned corner certificates images and histories has been provided.

The available line data set is the MN/DOT Basemap PLS Layers, which includes layers for PLS section lines and township lines digitized from USGS 1:24,000 topographic maps during the 1980s-1990s.

Polygon data sets include:

- LMIC 100K Township, Range, Section, Quarter-Quarter (TRSQ) Data Set, which represents the Township, Range, Section, Quarter section, and Quarter-quarter section divisions of the state digitized from USGS 1:100,000-scale 30-minute by 60-minute topographic quadrangle maps published between 1977 and 1986. All survey lines were extended across water boundaries;
- LMIC 100K Township, Range, Section (TRS) Data Set, which contains all PLS section and township boundaries as well as county boundaries for Minnesota. This data set also was digitized from the same maps as described above.
- DNR Lands and Minerals Division's Higher Resolution PLS Layer, which contains land survey information, constructed using section corner coordinates from the Control Point Inventory and using information from the original surveyor's notes and plat maps, at a scale of 1:24,000 or larger.

Currently, Mn/Dot and the National Geodetic Survey, in cooperation with county surveyors, are in the process of tying the PLSS to the geodetic control network.⁵⁶ However, less than half of Minnesota's counties have completely acquired geodetic values for their Public Land Survey corners. Furthermore, neither Mn/DOT nor any other organization maintains an official record of county geodetic control for PLS corners.

⁵⁶ MGIC. 2003. Minnesota Cadastral I-Plan. Version 1.1. January 6, 2003.

(2) *Geodetic Control*

The Minnesota Department of Transportation (Mn/DOT) maintains a statewide *Geodetic Database* containing information on permanent geodetic control marks, which are referenced to the National Geodetic Reference System (NAD 27, NAD 83, NGVD 29, NAVD 88), located within Minnesota and along its boundaries. Created in 1998, this database is continuously updated and is associated with the *Minnesota Public Land Survey System Control Point Inventory*.⁵⁷

Automation of geodetic information began in Minnesota in the 1970s, with the horizontal datum NAD 1983 and vertical datum NAVD 1988 becoming available in 1986 and 1991, respectively. County coordinate systems also were developed and implemented during this time.

In 1996, the National Geodetic Survey (NGS) adjusted the Minnesota High Accuracy Reference Network (HARN) observations, acquired during 1993 - 1996 using high precision GPS techniques, and then used these fixed HARN stations to readjust the geodetic network based on the NAD 1983 Datum. Subsequent adjustments have employed these fixed HARN stations.⁵⁸

b) Parcel Specific Information

(3) *Parcel Data Committee (1995 - 1997)*

The Governor's Council on Geographic Information created the Parcel Data Committee in 1995 "to develop strategies to promote the development of parcel-level data, [to] identify resources that will aid in the development of parcel data, and [to] evaluate and recommend standards and guidelines related to parcel data."⁵⁹ One of the Parcel Data Committee's major initiatives was to study the issues surrounding the use of parcel identification numbers in Minnesota and to make recommendations regarding the need for a statewide parcel identifier standard. After examining the parcel identification code formats used by each of Minnesota's 87 counties, the Parcel Data Committee determined that altering existing PIN formats would be prohibitively expensive for most counties. Thus, in its 1997 report *Identifying Land Parcels: Is a Statewide Format Needed*,⁶⁰ the Committee did not recommend a statewide PIN standard. Rather, it recommended the creation of a parcel identification numbering system that would uniquely identify every parcel in Minnesota by attaching each county's unique numerical code to each parcel identifier.

c) Land Records Modernization Committee (1995-2003)

At the present time, there is no legislative authority or coordinated state program to collect local parcel information. While the Minnesota Governor's Council for Geographic Information (GCGI) has developed a

⁵⁷ <http://www.lmic.state.mn.us/chouse/metalong.html>

⁵⁸ Mn/DOT. 2000. Geodetic Control Documentation Report.

⁵⁹ Parcel Data Committee website: <http://www.gis.state.mhn.us/committe/parcel/parcel.html>

⁶⁰ <http://www.mnplan.state.mn.us/press/gisparcl.html>

proposal for statewide land records modernization,⁶¹ it has not been funded to date.⁶²

In the mid-1990s, the Governor's Council on Geographic Information (GCGI) created the Land Records Modernization (LRM) Committee to examine strategies for legislative funding of GIS. To this end, the LRM Committee explored several funding strategies proposed by other states, including Wisconsin, Michigan, and New York. The LRM Committee found that funding legislation shared seven common elements:

- "Created a coordinating body and define the members;
- Defined the mission, duties and powers of the coordinating body;
- Provided for the creation of a dedicated fund from which aid to local governments can be granted;
- Provided for the adoption of a local government plan by the coordinating body before grants and aid are given;
- Provided for a portion of the funds collected to be kept by or returned to local governments;
- Provided for data coordination at a statewide level;
- Provided funding through fees or taxes on real property transfers, such as recording fee increases, a special fee added to the recording fee or deed tax or real property tax increases based on the value of the property."⁶³

After exploring the Wisconsin model in greater depth, the LRM Committee presented an outline of a Land Records Modernization Program to the GCGI in 1996. LMIC recommended \$10 million in funding for this initiative, although the budget was not incorporated into the Governor's budget, partly because neither strong local government support nor a compelling state interest could be demonstrated.

The following year, the LRM Committee sought strategic partners, including the Association of Minnesota Counties (AMC), the Minnesota Association of County Officers (MACO), and the League of Minnesota Cities (LMC). The AMC passed a resolution in support of the land records modernization concept, formed a joint committee with LMC, and worked with the GCGI to review and refine the LRM proposal. By 1998, county recorders, county auditors, and county treasurers associations passed resolutions asking GCGI to develop statewide standards for land records systems. However, after submitting a final *Report to the*

⁶¹ Governor's Council on Geographic Information. 2000. Executive Summary: Proposed Land Record's Modernization Program for Minnesota.

<http://www.gis.state.mn.us/committe/land/lrm2000/LRMprogram.htm>

See also, Land Records Modernization Committee. 1999. Report to Governor's Geographic Information Council. June 1999. http://www.mnplan.state.mn.us/pdf/1999/lmic/land_record.pdf

⁶² Minnesota Cadastral I-Plan. Draft. June 17, 2002. p. 2

⁶³ Land Records Modernization Committee. 1999. Report to Governor's Geographic Information Council. June 1999. p. 1 http://www.mnplan.state.mn.us/pdf/1999/lmic/land_record.pdf

Governor's Geographic Information Council (1999),⁶⁴ the LRM Committee temporarily disbanded in June 1999, recommending that a land records modernization model first be tested and validated within the context of county pilot projects.

In October 1999, the LRM Committee reconvened to discuss the work accomplished by the previous committee and to set priorities for the coming year. The Committee agreed that all levels of government and the private sector would need to be represented in the process and that "key players" would need to be established early on. Today, the LRM Committee is working within the context of the I-Team Initiative, a joint project of the Federal Geographic Data Committee (FGDC), the Federal Office of Management and Budget (OMB), and other strategic partners.

While the Proposed Land Records Modernization Program serves as a basis for ongoing discussions, it has not been funded and is not actively promoted by the GCGI. The purpose of the Proposed Land Records Modernization Program for Minnesota,⁶⁵ as described in the *Executive Summary* (2000), was to support local land records modernization efforts, to encourage the development of integrated land records information systems, and to facilitate the creation of statewide priority data sets. The LRM Committee defined "land records" as "the data, information or maps regarding any physical, legal, economic, or environmental characteristics concerning land, water, groundwater, subsurface resources, or air within Minnesota" and "land records modernization" as "the improvement and updating of the processes and procedures for collecting, sharing, utilizing, presenting, maintaining, and storing land records through the efficient, effective, and appropriate use of technology."

The LRM Committee envisioned redirecting some of the revenues from the current mortgage registration and deed tax to fund this program. Minnesota counties retains only 3% of these taxes to cover recording and processing costs. Under the proposed LRM program, all counties would retain 100% of all revenues generated by mortgage registration and deed taxes up to a minimum annual allocation of \$80,000 dollars; after which, counties would retain 10% of all subsequent revenues generated from these taxes. Those counties that do not generate the minimum would receive funds from the state to make up the difference. In order to retain and use these funds, counties would be expected to develop a land record modernization plan in accordance with state guidelines.

The emphasis of the proposed LRM program was on allowing counties to retain local control of system design and implementation, while ensuring adequate and stable funding for modernization efforts. Under the proposed LRM program, the role of local governments was to:

⁶⁴ Land Records Modernization Committee. 1999. Report to Governor's Geographic Information Council. June 1999. http://www.mnplan.state.mn.us/pdf/1999/lmic/land_record.pdf

⁶⁵ Governor's Council on Geographic Information. 2000. Executive Summary: Proposed Land Record's Modernization Program for Minnesota. <http://www.gis.state.mn.us/committe/land/lrm2000/LRMprogram.htm>

- “Create a land records modernization plan that meets local priorities;
- Design systems that support data compatibility and sharing within counties, between counties and with other governmental entities (local, state, regional and federal).”

The proposed role of the State of Minnesota was to:

- “Coordinate collection and distribution of funds for the Land Records Modernization Program;
- Assist counties in planning and implementing modernization and integrated land records systems;
- Provide technical assistance where needed;
- Through the existing annual county audits, review the collection and use of funds for land records modernization;
- Identify and promote statewide solutions, priority data and access;
- Promotion of data integration to minimize duplication.”

d) Electronic Real Estate Recording Task Force

At present, Minnesota recorders and registrars only can accept paper documents for recording. The Electronic Real Estate Recording Task Force (ERERTF) is now in the process of studying and making recommendations regarding the implementation of a system for electronic filing and recording of real estate documents. Several elements are under consideration: “(1) technology and computer needs; (2) legal issues such as authenticity, security, timing and priority of recordings, and the relationship between electronic and paper recording systems; (3) cost-effectiveness of electronic recording systems; (4) timetable and plan for implementing an electronic recording system, considering types of documents and entities using the system and volume of recordings; (5) permissive versus mandatory systems; and (6) other relevant issues identified by the task force.”⁶⁶

The ERERTF Business Analyst Services Project *Cost Benefit Analysis*,⁶⁷ published May 30, 2002, explores the costs and benefits of implementing three “models” for electronic real estate recording: 1) transmittal of document images only; 2) transmittal of data related to the document, and an image of the document; and 3) transmittal of an integrated electronic document that includes both data and presentation information. This report also briefly considers three different funding structures for county implementation of an electronic real estate recording system.

The GIS Subcommittee of the ERER Task Force, which consisted of six members representing the LMIC and county auditors, surveyors, and recorders, expressed several concerns in the ERER standards

⁶⁶ <http://www.commissions.leg.state.mn.us/lcc/erertf.htm>

⁶⁷ ERERTF Cost Benefit Analysis v1.0: <http://www.commissions.leg.state.mn.us/lcc/erercost1.pdf>

development process. These are enumerated in the GIS Subcommittee Meeting Minutes from January 14, 2002.⁶⁸ Of note, the GIS Subcommittee recommended making street addresses a part of the index standards. The current electronic document standards adopted by the ERER Task Force provide for a Parcel ID field, but do not require a link to GIS mapping.

e) Parcel Mapping Inventory

During 2002, the Minnesota Department of Transportation (Mn/DOT), in coordination with the University of Minnesota and Pro-West & Associates, conducted a survey of counties, cities, Indian Nations and other organizations in the State that archive, create and maintain parcel data in the to produce a statewide parcel data inventory.⁶⁹ The information gathered will be used in the strategic planning process currently being coordinated by the Minnesota Governor's Council on Geographic Information.

f) Minnesota Spatial Data Infrastructure

The Governor's Council on Geographic Information (GCGI) is the lead coordinating organization in Minnesota for the federal I-Team Geospatial Information Initiative (I-Team Initiative). Minnesota I-Teams⁷⁰ have been established for the production, maintenance, and exchange of several framework data layers, including geodetic control, elevation, cadastral, administrative boundaries, transportation, hydrography, ortho/imagery, and soils.

Table 1: Minnesota Framework Data Initiative Data Themes

FGDC Framework Data	Minnesota Priority Data Sets
Cadastral	Soils
Digital Orthoimagery	
Elevation & Bathymetry	
Geodetic Control	
Governmental Units	
Hydrography	
Transportation	

g) Digital Parcels

The GCGI's Land Records Modernization Committee, which serves as the Minnesota Cadastral I-Team, is in the process of developing a Cadastral Implementation Plan (I-Plan) to:

⁶⁸ <http://www.commissions.leg.state.mn.us/lcc/gis020114.htm>

⁶⁹ Theroux, A. and Craig, W. 2002. A Statewide Parcel Map Inventory in Progress. GIS/LIS News Fall 2002. <http://www.mngis.org/newsletter/fall2002.pdf>

⁷⁰ Minnesota I-Teams Initiative: http://www.gis.state.mn.us/i_plan.html

- “Identify the resources, processes, organizational structures and strategies needed to develop and maintain records that describe and map the pattern of ownership within the state of Minnesota, including assembly of locally-produced parcel data into a statewide view, and
- Support the operational needs of organizations within Minnesota.”⁷¹

The model Land Records Modernization program developed in 1999 by the GCGI’s Land Records Modernization Committee, described above, serves as a basis for ongoing discussions. The most recent Cadastral I-plan recommends designating a state agency as the custodian for a statewide cadastral layer; Minnesota county governments would remain the primary data custodians for most parcel data. When appropriate, regional organizations, such as the Minneapolis-St. Paul Metropolitan Council, could assemble local parcel data into intermediate aggregations. At this point, however, a consistent source of long-term funding does not exist for the development of a statewide parcel database.

h) Digital Orthophotography

Completed in 1998, the comprehensive statewide data development program “Base Maps for the 90s” not only resulted in statewide orthophoto coverage (1:12,000 DOQs with 1-m resolution), but also digital elevation models, color-IR aerial photography, and revisions to USGS quadrangles in areas of rapid growth. The cooperative project took eight years and cost \$7 million dollars; the cost was shared equally between state and federal partners.⁷²

In 2002, the USDA Farm Service Agency (FSA) piloted the National Imagery Program (NAIP) acquiring leaf-on aerial images and producing 1-meter resolution orthophotos for 28 counties in southern Minnesota. With coordination by LMIC and funding from state operating agencies (Mn/DOT, Pollution Control Agency, and DNR), the state is contributing to the 2003 NAIP program to complete orthoimagery for the entire state. As no new NAPP photography flights are scheduled to be flown in Minnesota, and hence no updated USGS DOQ products will be produced in the near future, the NAIP may become an important source of Minnesota DOQs.⁷³

i) Minnesota Geographic Data Clearinghouse

The Clearinghouse⁷⁴ offers a portal, the GeoGateway, and nodes maintained by organizations throughout the state. Partners include LMIC, Minnesota DNR, Metropolitan Council of the Twin Cities, MetroGIS Project, and the Arrowhead Regional Development Commission.

⁷¹ GCGI. 2003. Minnesota Cadastral I-Plan. Version 1.1. January 6, 2003. p. 1

⁷² MetroGIS conducts updates for its seven counties on a 3-5 year cycle.

⁷³ Hockert, D. 2002. Will NAIP be Your Source for New DOQs? You Decide! GIS/LIS News. Fall 2002. <http://www.mngis.org/newsletter/fall2002.pdf>

⁷⁴ Minnesota Geographic Data Clearinghouse website: <http://www.lmic.state.mn.us/chouse/index.html>

2) Statutes

a) Minnesota Governor's Council on Geographic Information (GCGI)

Executive Order 99-06

Established in 1991, the GCGI must be reauthorized when a new governor takes office. Governor Jesse Ventura's Executive Order 99-06 states that "the council shall be established to provide advice and support for the coordination of activities, policies and investments regarding the development and use of geographic data and geographic information technologies within Minnesota...The Council shall be comprised of no more than 18 voting members plus ex-officio members that represent the GIS/LIS consortium, the Land Management Information Center, the Office of Technology, the Minnesota Legislature and the U.S. Geological Survey. The Director of the Office of Strategic and Long-Range Planning shall appoint the Council's voting members to represent state government, higher education, local government, federal government, other public organizations, and GIS users in the private sector...and appoint a chair for the Council from the voting membership"⁷⁵

This Executive Order remains in effect until April 6, 2003. Through resolution GCGI 03-01-01, the Minnesota Governor's Council on Geographic Information has recommended that Governor Pawlenty reauthorize the Council through a new Executive Order.⁷⁶

b) Land Management Information Center

Minnesota Statute 4A.05 Land management information center.⁷⁷

"Subdivision 1. Purpose. The purpose of the land management information center is to foster integration of environmental information and provide services in computer mapping and graphics, environmental analysis, and small systems development. The director, through the center, shall periodically study land use and natural resources on the basis of county, regional, and other political subdivisions.

Subd. 2. Fees. The director shall set fees under section [16A.1285](#) reflecting the actual costs of providing the center's information products and services to clients. Fees collected must be deposited in the state treasury and credited to the land management information center revolving account. Money in the account is appropriated to the director for operation of the land management information system, including the cost of services, supplies, materials, labor, and equipment, as well as the portion of the general support costs and statewide indirect costs of the office that is attributable to the land management information system. The director may require a state agency to make an advance payment to the revolving fund sufficient to cover the agency's estimated obligation for a period of 60 days or more. If the revolving fund is abolished or liquidated, the total net profit from operations must be

⁷⁵ Minnesota Executive Order 99-06: <http://www.gis.state.mn.us/pdf/ExecOrder2.pdf>

⁷⁶ http://www.gis.state.mn.us/pdf/Resolution03_01_01.pdf

⁷⁷ Minnesota Statute 4A.05 <http://www.revisor.leg.state.mn.us/stats/4A/05.html>

distributed to the funds from which purchases were made. The amount to be distributed to each fund must bear to the net profit the same ratio as the total purchases from each fund bear to the total purchases from all the funds during a period of time that fairly reflects the amount of net profit each fund is entitled to receive under this distribution. [HIST: 1993 c 192 s 73,74; 1995 c 233 art 2 s 4]"

c) Recording and Filing Conveyances

Property Interests and Liens, Chapters 500 thru 515B Recording and filing conveyances Chapter 507 272.192 Records.

"The county auditor shall keep a record of all parcels of land which have been coded under this system. In such record the auditor shall enter the description of the land as described in the instrument of conveyance of record in the office of the county recorder or registrar of titles, or the description of the land as then carried on the assessment and tax rolls of the county, and immediately following such description shall enter the code number assigned to said parcel of land [HIST: 1951 c 638 s 2; 1957 c 371 s 2; 1976 c 181 s 2; 1986 c 444]."

d) Recorder's Document Standard

507.093 Standards for documents to be recorded or filed.

(a) The following standards are imposed on documents to be recorded with the county recorder or filed with the registrar of titles:

- (1) The document shall consist of one or more individual sheets measuring no larger than 8.5 inches by 14 inches.
- (2) The form of the document shall be printed, typewritten, or computer generated in black ink and the form of the document shall not be smaller than 8-point type.
- (3) The document shall be on white paper of not less than 20-pound weight with no background color, images, or writing and shall have a clear border of approximately one-half inch on the top, bottom, and each side.
- (4) The first page of the document shall contain a blank space at the top measuring three inches, as measured from the top of the page. The right half to be used by the county recorder for recording information or registrar of titles for filing information and the left half to be used by the county auditor or treasurer for certification.
- (5) The title of the document shall be prominently displayed at the top of the first page below the blank space referred to in clause (4).
- (6) No additional sheet shall be attached or affixed to a page that covers up any information or printed part of the form.
- (7) A document presented for recording or filing must be sufficiently legible to reproduce a readable copy using the county recorder's or registrar of title's current method of reproduction.

The standards in this paragraph do not apply to a document that is recorded or filed as part of a pilot project for the electronic filing of real estate documents implemented by the task force created in Laws 2000, chapter 391.

(b) The recording or filing fee for a document that does not conform to the standards in paragraph (a) shall be increased as provided in sections [357.18](#), subdivision 5; [508.82](#); and [508A.82](#).

(c) The recorder or registrar shall refund the recording or filing fee to the applicant if the real estate documents are not filed or registered within 30 days after receipt, or as otherwise provided by section [386.30](#). HIST: 1996 c 338 art 3 s 1; 2000 c 275 s 2; 2002 c 365 s 1

e) Electronic Real Estate Recording Task Force (ERERTF)

Minnesota Sessions Laws 2000, Chapter 391-S.F. No. 3346

An act relating to real property; requiring the secretary of state to establish a task force to study and make recommendations on electronic filing of real estate documents.

Section 1. [ELECTRONIC FILING OF REAL ESTATE DOCUMENTS.]

Subdivision 1. [TASK FORCE; MEMBERSHIP.] The secretary of state shall establish a task force to study and make recommendations for the establishment of a system for the electronic filing and recording of real estate documents. The task force must include: (1) two members of the senate appointed by the subcommittee on committees of the committee on rules and administration and two members of the house appointed by the speaker of the house; (2) representatives of county recorders and other county government officials; (3) real estate attorneys, real estate agents, and public and private land surveyors; (4) representatives of title companies, mortgage companies, and other real estate lenders; (5) a representative of the Minnesota historical society and other state and local government archivists; (6) technical and industry experts in electronic commerce and electronic records management and preservation; (7) representatives of federal government-sponsored

Subd. 2. [STUDY AND RECOMMENDATIONS.] The task force shall study and make recommendations regarding implementation of a system for electronic filing and recording of real estate documents and shall consider: (1) technology and computer needs; (2) legal issues such as authenticity, security, timing and priority of recordings, and the relationship between electronic and paper recording systems; (3) cost-effectiveness of electronic recording systems; (4) timetable and plan for implementing an electronic recording system, considering types of documents and entities using the system and volume of recordings; (5) permissive versus mandatory systems; and (6) other relevant issues identified by the task force.

The task force shall submit a report to the legislature by January 15, 2001, outlining a proposed work plan and budget for consideration by the legislature. The task force expires June 30, 2003.

Minnesota Sessions Laws 2002, Statute 507.24

The ERER Task Force is extended to June 30, 2004

3) Funding and Costs

According to the Minnesota Cadastral I-Plan (2003), Minnesota's counties have made a total investment of roughly \$9-million dollars for digital parcel database development. Only local funds have been used. Based on Minnesota Department of Revenue records, the estimated total cost for developing digital parcel data for areas not yet mapped is between \$10 and \$15 million dollars. These figures assume specifications that entail geodetic control for the Public Land Survey and data entry using coordinate geometry or equivalent high-accuracy procedures. Furthermore, roughly 15,000 parcels are created annually in Minnesota. Mapping these new parcels would require an additional \$250,000 per year. Several state sources of supplemental funding have been explored, including:

- The state's general fund;
- Supplemental fees associated with real estate transactions; and
- The Minnesota Environmental Trust Fund administered as a grant from the Legislative Commission on Minnesota Resources.

But, as stated above, attempts to obtain long-term state funding have been unsuccessful. While the I-Team intends to continue pursuing these state funding options, federal sources of funding clearly will be needed.⁷⁸

4) Standards

a) Recorder's Document Standards

Effective August 1, 1997, all documents recorded or filed with the county recorder or filed with the registrar of titles after July 21, 1997, must adhere to Document Standards promulgated under Minnesota Statute § 507.093. For the full text of the standard, refer to:

<http://www.mncounties2.org/mncra/docstandards1.html>.

b) Electronic Real Estate Recording Task Force Electronic Recording Standards

The Electronic Real Estate Recording Task Force developed a set of Electronic Recording Standards⁷⁹ to ensure a uniform approach for sending and receiving documents electronically. While these standards are meant to apply to a number of different real estate documents, they do not mandate specific hardware or software solutions. These standards, however, do include a field for Property Identification Number (PIN) to ensure that recording systems may be linked to county GIS systems. The standards are applicable to both recording and registration systems and to all county offices including the recorder, registrar of titles, auditor, assessor, and treasurer.

All 87 counties in Minnesota were interviewed, in addition to private entities and out-of-state counties, as part of the standards development process. Pilot projects in five counties are now underway to test the effectiveness of these standards. Under Minnesota Statute § 507.093, the Document Standards do

⁷⁸ GCGI. 2003. Minnesota Cadastral I-Plan. Version 1.1. January 6, 2003.

⁷⁹ ERERTF Business Analyst Services Project. 2002. Electronic Recording Standards. May 30, 2002.
<http://www.commissions.leg.state.mn.us/lcc/standardsdoc1.htm>

not apply to pilot filings i.e. Electronic Task Force (electronic filing of documents). In addition, under statute 507.24, the original signatures requirement is waived for pilot counties.

c) **Minnesota Governor's Council on Geographic Information GIS Standards and Best Practices**

The Information Policy Council (IPC), which advises the Office of Technology, provides a framework for the development of information technologies and standards. These standards apply directly to state agencies.

The Minnesota Governor's Council on Geographic Information's GIS Standards Committee helps coordinate the development of statewide geographic data standards and guidelines.⁸⁰ Existing Minnesota geographic information standards and guidelines include the following:⁸¹

- [Numeric codes for the identification of counties in Minnesota](#) (MN 097-143)
- [Codes for the identification of the States, the District of Columbia and the outlying areas of the United States, and associated areas](#) (MN 094-335)
- [State Agency Coordinate Interchange Standard](#) (MN 17-1)
- [A Methodology for Measuring and Reporting Positional Accuracy in Spatial Data](#) (MN 19-1)
- [Minnesota Geographic Metadata Guidelines, version 1.2](#) (MN 17-1.2)

To the extent possible, existing Federal standards will be incorporated into Minnesota standards.⁸² The Parcel Mapping Workgroup of the GCGI's Land Records Modernization Committee, formed in February 2003, is in the process of reviewing the FGDC cadastral standards.⁸³

The GCGI also recognizes examples of projects and processes as models for use by GIS practitioners in Minnesota. These are as follows:⁸⁴

- [Minnesota Geographic Metadata Guidelines](#): The guidelines are based on a standard developed by the Federal Geographic Data Committee in 1993.⁸⁵
- [Implementation Guide for Parcel-Based GIS in Minnesota Local Government](#): This document was created to help local governments analyze their geographic information needs and implement a parcel-based GIS system.⁸⁶

⁸⁰ GCGI Standards Committee website: <http://www.gis.state.mn.us/committe/stand/stand.htm>

⁸¹ Minnesota Standards and Guidelines: <http://www.gis.state.mn.us/committe/stand/index.htm> and <http://www.gis.state.mn.us/exist.htm>

⁸² <http://www.gis.state.mn.us/devel.htm>

⁸³ Land Records Modernization Committee Meeting Notes February 20, 2003. http://www.gis.state.mn.us/committe/land/lrm2000/lrm_03feb.htm

⁸⁴ Minnesota GIS Best Practices <http://www.gis.state.mn.us/best.htm>

⁸⁵ <http://www.gis.state.mn.us/stds/metadata.htm>

⁸⁶ <http://www.gis.state.mn.us/iisac/gisindex.html>

- [Identifying Land Parcels: Is a Statewide Standard Needed?](#) September 1997: This document examines parcel identification numbers used by Minnesota's 87 counties and explores the need for a standardized statewide format.⁸⁷

In general, there is some apprehension among counties regarding state requirements (unfunded mandates). Counties have resisted the idea of statewide parcel mapping standards and hence, every county is free to choose its own convention. However, every county in Minnesota complies with having unique parcel identifiers.

The GCGI document *Starting Points: Conventions for Geographic Information*⁸⁸ catalogs more than 55 publicly developed specifications and procedures for geographic information systems and serves as starting point from which GIS users in Minnesota may begin developing their own standards. For example, the Minnesota Department of Natural Resources Division of Minerals maintains a Public Land Survey Geocoding Standards for New Systems and Data File Interchange (1993) that provides coding schemes for: county, township, range, section, 40-acre parcel and government lots based on Minnesota Land Management System guidelines. It also contains instructions for coding PLS lines, data file format and parcel identification using the department's Tract-ID system.

d) MetroGIS Data Content Standards and Best Practices

The MetroGIS Policy Board endorses the following GIS-related data standards and guidelines, as well as best practices, and encourages the MetroGIS community to incorporate them into their day-to-day operations:⁸⁹

Best Practices to More Easily Share Commonly Needed Data

- [DataFinder Thematic Data Categories](#)
- [Metadata Guidelines](#)
- [Metro-Wide Coordinate System](#)
- [National Standard for Spatial Data Accuracy \(NSSDA\)](#)

Data Content Standards

- Address Guidelines and Issues for Working with Address Data
- [County and Minor Civil Division Coding Exchange Standards](#)
- [Minnesota Land Cover Classification System \(MLCCS\)](#)
- [Regional Planned Land Use Coding Scheme and Dataset](#)

c. Issues and Opportunities

Unfortunately, the Minnesota GIS community has been unable to make an effective business case for investing in GIS, and hence, has been unable to compel the State to

⁸⁷ <http://www.mnplan.state.mn.us/press/gisparcl.html>

⁸⁸ <http://www.mnplan.state.mn.us/pdf/startpt.pdf>

⁸⁹ MetroGIS Standards: <http://www.metrogis.org/data/standards/index.shtml>

provide funding for a statewide land records modernization program. In the future, advocates will have to reframe the discussion to better address local needs and concerns for land records management.

Another area of possible concern is data access policy. Under Minnesota Statutes Chapter 13, counties are permitted to retain ownership of and to sell their data for more than the cost of reproduction. The current Cadastral I-Plan asserts that “a statewide policy must respect these differences [in opinion regarding cost-recovery] but also [must] foster as much consistency as possible in the related policies.”

While Minnesota may not have a central authority for statewide framework data, many framework data themes have been developed and are being maintained by state agencies. Furthermore, the state consistently demonstrates a commitment to identifying strategic needs through statewide surveys and assessments.⁹⁰ It is hoped that the current economic downturn will spark tighter collaborations and integration, resulting in the more effective and efficient use of existing resources.

⁹⁰ Arbeit, D. 2001. State Geographic Information and Related Technology (GI/GIS) Profile: Minnesota. June 19, 2001. <http://www.mnplan.mn.us/Report.html?id=972>

3. Montana

The State of Montana fosters a statewide approach to GIS coordination and data development. The Montana Geographic Information Council's vision for the future is that "[g]eographic information technology and geospatial data should become commonplace desktop tools, integral to every-day problem solving and managed as part of the State Strategic Plan for IT. Because of the many shared uses of geospatial data, agencies must collaborate when using GIS technology and creating geospatial data. The state must monitor current investments to maximize benefits to the state and plan and execute new investments to remain competitive with other states in the global economy."⁹¹

Montana is ahead of most states in the collection and standardization of parcel data. Building upon the success of the Montana Cadastral Mapping Project, the Montana Spatial Data Infrastructure initiative is close to achieving a seamless, statewide cadastral database.

a. Administrative Structures/Coordination Structures and Procedures

In Montana, the County Clerk and Recorder handle the majority of local land records management functions and have de facto responsibility for countywide coordination. County Assessors, on the other hand, have all but disappeared from the landscape; assessment functions have been assumed by the Montana Department of Revenue in all but eight counties. As a result, parcel mapping is standardized and linked with the state's CAMA database in at least 48 out of the 56 counties; the remaining 8 counties are linked to the state system, but are not entirely standardized. Land management (permitting and development) is the responsibility of county and municipal governments and is not regulated by the State of Montana. Road centerline and address range files are created and maintained locally by 9-1-1 Center administrators and staff,⁹² by public works departments, or by Federal Agencies on Public Lands.

Montana has several organizations that guide statewide land records modernization efforts, including: 1) the Montana Geographic Information Council (MGIC); 2) the GIS Services Section within the Department of Administration's Information Services Division (ITSD); 3) the Natural Resource Information System (NRIS) at the Montana State Library; and 4) the Montana Department of Revenue (DOR).

Statewide professional organizations such as the Montana Local Government GIS Coalition (MLGGC), the Montana GIS Interagency Technical Working Group (ITWG), the Montana GIS Users Group, and the Montana Association of Registered Land Surveyors (MARLS) also provide guidance, education and training.

1) County Clerk and Recorder

Under Montana Code §7-3-434, a clerk and recorder, "shall be elected, appointed by the local government commission, appointed by the chairman of the local government commission, selected as provided by ordinance, may at the discretion of the commission be selected as provided by ordinance, or shall not be included

⁹¹ State of Montana Strategic Plan for Information Technology 2004-2005, p. 19.

⁹² <http://state.mt.us/itsd/techmt/publicsafety.asp>

in this form as a separate office.” [En. 47A-3-205 by Sec. 1, Ch. 344, L. 1975; amd. Sec. 3, Ch. 351, L. 1977; R.C.M. 1947, 47A-3-205(3)(c).]

Under § 7-4-2611, the county clerk of a county is also clerk of the county commissioners and ex officio recorder. “The county clerk shall: take charge of and safely keep or dispose of according to law all books, papers, maps, and records that may be filed or deposited in the county clerk's office; record all the proceedings of the board; make full entries of all its resolutions and decisions on all questions concerning the raising of money for and the allowance of accounts against the county; record the vote of each member on a question upon which there is a division or at the request of any member present; sign all orders made and warrants issued by order of the board for the payment of money and certify the orders and warrants to the county treasurer; record the reports of the county treasurer of the receipts and disbursements of the county; preserve and file all accounts acted upon by the board; preserve and file all petitions and applications for franchises and record the action of the board on the petitions and applications; record all orders levying taxes; designate upon each account allowed by the board the amount allowed and deliver to any person who may demand it a certified copy of any record or any account on file in the county clerk's office; when a new township is organized or the boundaries of a township are altered, immediately make out and transmit to the secretary of state a certified statement of the names and boundaries of the township organized or altered; keep other records and books and perform other duties that are prescribed by law or by rule or order of the board...”

In addition, under Montana Code § 76-3-613, the county clerk and recorder “shall maintain an index of all recorded subdivision plats and certificates of survey. This index shall list plats and certificates of survey by the quarter section, section, township, and range in which the platted or surveyed land lies and shall list the recording or filing numbers of all plats depicting lands lying within each quarter section. Each quarter section list shall be definitive to the exclusion of all other quarter sections. The index shall also list the names of all subdivision plats in alphabetical order and the place where filed [En. Sec. 15, Ch. 500, L. 1973; R.C.M. 1947, 11-3873].”

2) Compliance, Valuation and Resolution, Montana Department of Revenue (DOR)

Compliance, Valuation and Resolution Division of the Department of Revenue oversees audits and measures to verify tax-paying entities are in compliance with the law and will establish values of property for purposes of taxation. The CVR maintains cartographers at eight regional field offices around the state.

Cartographers are responsible for constructing and maintaining the cadastral mapping system and associated ownership information, for researching and assigning geocode numbers for parcel identification, and for the application of GIS technology to the cadastral program. Cartographers provide parcel maps for property assessment and serve as the primary contact for questions regarding mapping and ownership related problems. Property Tax Appraisers and Property Valuation Technicians also serve under the CVR Department. Property Valuation Technicians perform desk audits for valuation purposes and maintain all ownership records for ad valorem tax purposes.

3) Montana Geographic Information Council (MGIC)

Initially created by executive order signed by Governor Racicot in 1997 and then reaffirmed by executive orders in January 2000 and November 2001, the Montana Geographic Information Council (MGIC)⁹³ is responsible for “provid[ing] policy level direction and [for promoting] efficient and effective use of geographical information.” To this end, the Council must:

- “promote a spirit of cooperation among state, federal and local agencies, and the private sector in addressing geographic data and information needs and services in Montana;
- review and establish priorities for statewide geographic information needs and assist in the development of implementation plans;
- facilitate cost sharing and collaborative arrangements to develop and maintain high-priority GIS data bases and applications programs; and
- promote coordination of programs, policies, technologies and resources to maximize opportunities and minimize duplication of effort, and to facilitate the documentation, distribution and exchange of geographic information;
- ensure the development of consistent policies, standards and guidelines for geographic information; complement and enhance ongoing coordination efforts of the Montana GIS Interagency Technical Working Group, the Montana Local Government GIS Coalition, the Montana GIS Users Group, and others;
- serve as the primary point of contact for national, regional, and other states' GIS coordinating groups for the purpose of channeling issues and projects to the appropriate individuals, organizations, or agencies; and
- provide recommendations to the Governor and the legislature, when appropriate, concerning issues related to geographic information in Montana.”

The Council is comprised of 18 members, appointed by the Governor, as follows:

- four state agency heads, including the Director of the Department of Administration who shall serve as chair or appoint a chair from the Council membership; the State Librarian; and Directors of three other state departments;
- one representatives from county and municipal government, at least one of whom is a local government representative active in land information systems;
- an individual representing the Federal Geographic Data Commission (FGDC);
- one representative from the US Department of Agriculture;
- one representative from the US Department of the Interior;
- two representatives chosen from public utilities or private businesses active in land information systems;

⁹³ MGIC website: <http://www.mlggc.org>

- one Tribal representative;
- one representative of the University System;
- the chair of the Montana GIS Interagency Technical Working Group;
- the chair of the Montana Local Government GIS Coalition; and
- the president of the Montana Association of Registered Land Surveyors (MARLS).

The Department of Administration Information Services Division provides technical and administrative support for the Council, while the Montana GIS Interagency Technical Working Group and the Montana Local Government GIS Coalition provide additional technical support. The Council also may seek technical support from the Montana GIS Users Group and other public or private sector entities.

4) GIS Services and Coordination Section, Information Technology Services Division, Department of Administration

The Department of Administration's Information Services Division (ITSD) is the lead agency for the provision of information technology infrastructure in support of state agencies. As such, ITSD promotes, coordinates, and approves the development and sharing of information technology application software and management systems. In addition, ITSD establishes and enforces statewide policies and standards for information technology in state government.

The GIS Services and Coordination Section is responsible for statewide coordination of GIS activities. A major focus of the GIS Service Section is with the Montana Spatial Data Infrastructure Initiative and with the Montana Cadastral Mapping Project. GIS Services also provides staff support to the Montana Geographic Information Council.

5) Public Safety Services Office, Information Technology Services Division, Department of Administration

The Public Safety Services Office manages statewide planning of public safety communications and the State's 9-1-1 program and E9-1-1.

6) Natural Resource Information System (NRIS), Montana State Library

Established in 1985, the Montana Natural Resource Information System (NRIS)⁹⁴ is a program of the Montana State Library. NRIS provides a clearinghouse and referral service linking users to information sources and data on Montana's natural resources. In addition, it serves as the primary clearinghouse for all geospatial data. NRIS has three programs: 1) the Natural Heritage Program, which focuses on biodiversity information; 2) the Water Information System, which provides information about such topics as water, quality, groundwater, surface water, and water rights; and 3) the Geographic Information System, which provides maps, spatial data, analytical services, and technical assistance.

⁹⁴ NRIS Website: <http://nris.state.mt.us/>

7) Montana Local Government GIS Coalition (MLGGC)

Founded in 1995 by local government GIS practitioners, the Montana Local Government GIS Coalition (MLGGC) is an organization whose mission is “to facilitate and advance the implementation and development of GIS technology in city and county government through communication and data sharing.”⁹⁵ The goals of the MLGGC are to:

- “Promote a bottom up approach for data acquisition beginning at the local level;
- Facilitate an exchange of ideas among local government GIS users;
- Provide information through workshops, seminars, and meetings;
- Establish a forum to identify common problems and unified solutions which benefit city, county and state entities;
- Provide non-computer users with information and technical assistance; and,
- Represent and advise MLGGC participants on state and regional technological issues.”

MLGGC has several subcommittees and working groups, including: the Addressing Standards Committee; the Montana Water/Wastewater GIS Users Group; the Montana Transportation Working Group; the Montana GPS Users Group; and the Web Applications Working Group.

8) GIS Interagency Technical Working Group (ITWG)

Established in the mid-1980s, the Montana Interagency GIS Technical Working Group (ITWG)⁹⁶ provides an opportunity for state and federal natural resource agencies to exchange information regarding geospatial data and projects, to coordinate GIS activities, to develop standards, and to share resources. As of 2002, the ITWG, in collaboration with the Montana Local Government GIS Coalition, is taking the lead to identify champions and develop I-teams for the following data themes: Vegetation/Land Cover and Critical Infrastructure.⁹⁷ Previous ITWG priority spatial data themes have included DOQQ, hydrography, ownership/cadastral, PLSS, transportation, DEM, GCDB, land-use, soils administration, and geology.

9) Montana GIS Users Group

Founded in the early 1990s, the Montana GIS Users Group⁹⁸ provides a forum for federal, state, local, tribal, university, and private sector organizations and individuals to exchange information and ideas on GIS technology. The GIS Users Group also works closely with other statewide GIS organizations on statewide coordination of GIS activities.

⁹⁵ MLGGC website: <http://sun1.giac.montana.edu/mlggc.html>

⁹⁶ ITWG website: <http://mtgeo.org/itwg/>

⁹⁷ Montana Interagency GIS Technical Working Group: 2002 Work Plan, May 23, 2002, Version 3.0, p. 1-2.

⁹⁸ Montana GIS User Group website: <http://www.forestry.umn.edu/infotech/gis/mtgis/default.htm>

b. Control Structures

In 1994, state and federal agencies cooperated in an effort to convert U.S. Bureau of Land Management (BLM) 1:100,000-scale Surface Management Status maps into digital format. This effort resulted in a statewide digital public lands layer that distinguished various types of public ownership (e.g., State, USDA Forest Service, USDI National Park Service, etc), but did not identify the ownership of private parcels. Two years later, the Montana Cadastral Mapping Project was launched to facilitate the creation of a continuous and consistent digital data set representing all parcels in Montana.

1) Policies

a) Geographic Reference Framework

Several Federal agencies maintain geodetic control in Montana Public Land Survey corners, in addition to survey, mapping and construction control. These agencies include: National Geodetic Survey (NGS), USGS, Federal Highway Administration, Bureau of Land Management, Bonneville Power Administration, U.S. Forest Service, Bureau of Reclamation, Corps of Engineers, National Park Service, FAA, FCC, and the EPA. Of note, the Bureau of Land Management (BLM) maintains the Geographic Coordinate Database (GCDB), which represents the Public Land Survey System (PLSS) of the United States. The GCDB grid is computed from BLM survey records (official plats and field notes), local survey records, and geodetic control information.

The Montana Department of Transportation (MDOT) acquires control points for highway projects, right-of-way acquisition, aerial photography, and environmental assessment studies. MDOT maintains standards for the establishment and submission of this control. Other state agencies, such as the Department of Natural Resources and the Department of Fish, Wildlife & Parks, also acquire and possess project specific control.

At the local level, access to control records is on a county-by-county basis. Unfortunately, knowledge of and access to this data is often sporadic and inconsistent. The Clerk and Recorder's Office maintains the corner recordation books, although these often do not contain actual coordinate values. Other possible sources include the records of private surveyors or public works departments.

Under the Geodetic Control I-Team initiative, described below, it is hoped that the GIS Services Section will coordinate the creation of a geodetic control database that would document and standardize existing control and would enable the identification of areas in need of densification.

b) Montana Cadastral Mapping Project (MCMP)

Begun in 1996, the Montana Cadastral Mapping Project is an initiative to produce and maintain statewide digital cadastral information in a standardized format. "Cadastral data," as defined by the Montana Cadastral Mapping Project,⁹⁹ "is a framework of property boundaries along with

⁹⁹ Montana Cadastral Mapping Project website: <http://gis.doa.state.mt.us/>

association land ownership information.¹⁰⁰ The MCMP is a cooperative effort between the Montana Department of Administration (DOA), the Montana Department of Revenue (DOR), the USDI Bureau of Land Management, local governments, and the private sector. The ITSD GIS Services Bureau handles MCMP project management and coordination. The DOA provides mapped cadastral data, Web development, deployment, and maintenance, while the DOR provides CAMA data relating to the mapped cadastral data. Funding for this effort comes from a variety of sources, including state, federal and private organizations.

Most of the land in Montana is divided by the Public Land Survey System (PLSS). As Montana is predominately rural, only a small fraction of its land is subdivided, leaving a significant portion of the land in aliquot parts (i.e., regular subdivisions of sections into halves, fourths or smaller portions without a remainder).¹⁰¹ This facilitates the automation of ownership parcels. To create digital aliquot parcels, two data elements were needed: 1) the Montana Department of Revenue Computer Assisted Mass Appraisal System (CAMA) database, which provided legal land descriptions defining aliquot parts for all assessed property in the state, as well as geocodes and other associated information; and 2) the U.S. Bureau of Land Management Geographic Coordinate Data Base (GCDB), which provided the framework of coordinates defining the public land survey system (PLSS).¹⁰² Under the Montana Cadastral Mapping Program, the DOR, with the assistance of the GIS Services Bureau, standardized the collection of tax parcel data in 48 counties and worked with the remaining counties to incorporate their existing data into the Montana DOR CAMA database.¹⁰³ By using the GCDB as the framework for locating aliquot parcels in the CAMA database, most of the parcel mapping could be automated.

With the CAMA and GCDB databases in hand, the DOR field office cartographers and ITSD staff used a suite of programs developed by the GIS Services Section, called the Montana Automated Parcel Program (MAPP), to generate digital parcel maps for a large percentage of the land area of each township. The remaining areas were then submitted to vendors to fill in any gaps in the data (e.g., subdivisions, metes and bounds parcels).¹⁰⁴

¹⁰⁰ The project also notes the definition of “cadastral” as “Commonly, land ownership information. Formally, of or relating to an official register of the quantity, value, and ownership of real property used in apportioning taxes; showing or recording property boundaries, subdivision lines, buildings, and related details.”

¹⁰¹ Aliquot is “[t]he regular (mathematical) division of a parcel of land defined by the Public Survey System (PLSS). The basic unit of land in the PLSS is a section, a parcel of land one mile square in extent. The NORTH HALF of Section 1 (N1/2, 320 acres) is an aliquot part, as is the SOUTH EAST QUARTER (Se1/4, 160 acres), or the NORTH EAST QUARTER OF THE NORTH WEST QUARTER (NE1/4 NW1/4, 40 acres).”

¹⁰² The GCDB holds locational information (x/y coordinates) of all section, quarter section, and quarter-quarter section corners, by township.

¹⁰³ Draft Strategic Plan for the Statewide Cadastral Framework Database and Other Associated Features That Form a Comprehensive Land Information System, Montana Cadastral Implementation Team for the Governor’s Council on Geographic Information Systems and the Montana Geographic Information Council, <http://gis.doa.state.mt.us/mtgeo/Framework/Msdi/Cadastral/StratPlanCadastral.html>

¹⁰⁴ Bacino, Craig, 1999. Automating the Parcel Mapping Process. The Montana Cadastral Project *Surveying and Land Information Systems*, Volume 59, Number 3, pp. 165-168. <http://gis.doa.state.mt.us/cadastral/technote.html>

c) **Montana Spatial Data Infrastructure (MSDI)/I-Teams**

The Montana GIS community endorses the Federal Office of Management and Budget (OMB) Implementation, or I-Team Plan for assessing the status of the Federal Geographic Data Committee's (FGDC) Framework Data Themes,¹⁰⁵ which are commonly referred to as the National Spatial Data Infrastructure (NSDI) (Table 2: Montana Spatial Data Infrastructure Data Themes). Framework data themes form a critical foundation for a multitude of applications and meet the needs of the majority of spatial data users. The OMB and the FGDC have requested that states develop implementation plans to address the development and coordination of framework data. To meet this request and a similar directive from the Montana Legislative Audit Committee, the Montana Geographic Information Council, in coordination with MLGGC and ITWG, has assumed the responsibility for the Montana Spatial Data Infrastructure (MSDI). The purpose of this initiative is to review potential themes for inclusion in the I-Team process and to develop a strategic plan for the creation, maintenance and distribution of each theme.

Table 2: Montana Spatial Data Infrastructure Data Themes

FGDC Framework Data	Montana Priority Data Sets
Cadastral	Data Access
Digital Orthoimagery	Geology
Elevation & Bathymetry	Hydrologic Units
Geodetic Control	Land Cover
Governmental Units	Soils
Hydrography	Critical Structures
Transportation	Telecommunications
	Energy Distribution

Current efforts of the Montana Cadastral I-Team build on the foundation laid by the Montana Cadastral Mapping Project. The goal of the Cadastral I-Team is "[t]o create or integrate, maintain and provide access to comprehensive, standardized statewide digital landownership information associated with the rights and restrictions on the Montana landscape." The draft strategic plan (2001)¹⁰⁶ identified five key objectives:

- "Migrate existing cadastral data to a seamless statewide database;
- Incorporate additional related data into the cadastral database model (vertical integration);

¹⁰⁵ Montana Spatial Data Infrastructure: <http://gis.doa.state.mt.us/mtgeo/Framework/msdi.html>

¹⁰⁶ The draft strategic plan 2001 for the cadastral data them can be found at: <http://gis.doa.state.mt.us/mtgeo/Framework/Msdi/MsdiTheme.asp?theme=Cadastral#communication>
For an I-Team Quarterly Report November 20, 2002, visit: <http://gis.doa.state.mt.us/mtgeo/Framework/msdi/QuarterlyReports/IteamQtr200212.pdf>

- Encourage the DOR to prioritize the quality control and completeness of the CAMA database;
- Develop a plan for stable funding for the maintenance, integration and enhancement of the cadastral database;
- Develop agreements between agencies responsible for data maintenance, and agencies possessing information on data change.”

To this end, this I-Team is working on vertical integration; new county boundary data has been included as a feature class in the parcel database. In addition, BLM LR2000 data, which includes Federal land status, mineral leases, and the like, can be linked to the GCDB/PLSS data underlying the tax parcels. One of the next priorities will be to collect GPS control to increase the accuracy of the underlying PLSS.

The primary goal of the Imagery I-Team is to acquire detailed (1 meter) USGS orthophotographs (DOQQs) for the entire state. This first priority is near completion with imagery for 96% of the state being made available through the NRIS clearinghouse. In addition, the Imagery I-Team recommends acquiring additional aerial photography and other remotely sensed data sets, such as might be obtained through participation in the USGS ‘America View’ program, which would facilitate near real-time distribution of multi-spectral Landsat imagery for non-commercial public use. The Imagery I-Team also intends to work in coordination with the MLGCC and local governments to identify imagery acquisition opportunities that may serve the needs of local land use planning efforts and potential homeland security issues.

The Geodetic Control I-Team, on the other hand, is working to “increase the availability and use of geodetic and mapping control for Montana’s GIS and surveying communities.” The specific objectives of the Geodetic Control I-Team are:

- “Promote public access to public control data;
- Promote the use of standards for reporting control data;
- Develop an on-line database for storing, querying and accessing control data;
- Promote legislation to require that control generated with public funds be submitted to the public database;
- Promote training and education opportunities to foster an understanding of the value and use of control;
- Encourage cooperation on control policies.
- Develop a plan for densifying control where needed;
- Work with the NGS to place an NGS advisor in Montana.”¹⁰⁷

¹⁰⁷Geodetic Control I-Team Strategic Plan:

<http://gis.doa.state.mt.us/mtgeo/Framework/Msdi/GeodeticControl/StratPlanGeodeticControl.html>

The Montana Geographic Information Council also has determined that a statewide, standardized, addressed, digital transportation database is a top priority in the overall development of the Montana Spatial Data Infrastructure (MSDI). Many entities maintain road centerline files in Montana. Federal agencies such as the BLM and Forest Service manage roughly 60% of the land in the state and hence maintain large sections of the road network. At the local level, county roads and street centerlines are maintained by public works departments and 9-1-1 Centers. Somewhere between 30-35 counties have street centerlines with a variety of addressing systems. As a first step, a transportation coordinator has been hired to start integrating centerlines and addresses with the cadastral database.

d) Basic and Enhanced E-911 Addressing

The ITSD is responsible for disbursing 9-1-1 funds to local governments and for assisting local governments in the development of E-911 implementation plans. The following budgetary items, if related to a rural or municipal addressing project necessary for the successful implementation of enhanced 9-1-1, can be funded from money received from the Basic or Enhanced 9-1-1 Emergency Telecommunications Account¹⁰⁸ established under 10-4-301 MCA:

- “GPS centerline road mapping within the 9-1-1 jurisdiction, including purchase of GPS equipment and salaries for the person(s) doing the work;
- Assignment of addresses to all structures within the 9-1-1 jurisdiction and address verification, including verification letters to residents;
- Costs associated with coordinating addressing assignment with the U.S. Postal Service;
- GIS compilation of the data and final map output in both hardcopy and digital formats;
- Purchase of hardware and software necessary for the GIS work;
- Costs associated with assigning addresses and producing paper maps without the use of GIS;
- Cost for hiring a contractor to conduct the rural addressing project;
- Training costs for employee(s) who will assume maintenance of the addressing, MSAG and E9-1-1 databases; includes training in use of GPS equipment;
- Costs associated with addressing, MSAG, and E9-1-1 database maintenance; and
- 9-1-1 pro-rated share of costs associated with web-based GIS maintenance, including set-up fee and website maintenance.”

The GIS Services Section, in coordination with the E-911 Program Office, published a set of E-911 addressing guidelines, which is described below.

¹⁰⁸ State of Montana Basic and Enhanced 911 Funding Guidelines:
<http://state.mt.us/itsd/techmt/publicsafety/911%20Funding%20Guideines.doc>

2) Legal Framework

The Montana Geographic Information Council was established by Executive Order 17-97 in 1997 and reaffirmed by Executive Order 1-00 in January 2000 and in November 2001.¹⁰⁹ The Council exists for two years after the date of signature on each Executive Order.

In 1985, the legislature directed the State Library to create “a planning framework for the development of a natural resource information system, to implement the system, and to establish an ongoing Montana heritage program” [Montana Code Annotated 90-15-101] (Warnecke et al. 2001).

3) Funding and Costs

Tax parcel maintenance conducted by the DOR and qualified counties is estimated to cost \$300,000 annually and is covered under the DOR base budget. While this sum provides for parcel maintenance in all or portions of 50 counties, it does not cover expenses incurred by counties maintaining tax parcels themselves.

In addition to these expenditures, the program for the integration and enhancement of the statewide cadastral database is estimated to cost \$120,000 for the FY 04/05 biennium and to require 2 FTE positions. This estimate includes the cost to integrate of multi-jurisdictional data, to move that data to the new geodatabase environment, to adjust the data to maintain coincidence with the GCDB, to vertically integrate jurisdictional boundary and other data, to maintain and enhance the cadastral website, to educate users, and to complete a variety of other tasks. State budget cuts, however, have eliminated all DOR funding for this effort and no other sources have been identified at this time. Because of severe budget constraints, the GIS Services Section and MGIC are pursuing a two pronged approach. In the short-term, they hope to obtain the funding needed for FY04/05 through a partnership of state and federal agencies. In the long-term, they intend to introduce legislation for a recording fee.

4) Standards

The Interagency Working Group (ITWB) developed and later revised a Standards Plan in the early 1990s. While this plan is now outdated, the ITWG intends to revise it in the near future (Warnecke et al. 2001). The Montana Geographic Information Council, on the other hand, has two standards working groups: the Data Transfer Standards Work Group and the Metadata Standards Work Group. As much as possible, existing federal standards are followed, including the FGDC Cadastral Standard.

As of yet, there are no acknowledged statewide standards for establishing, maintaining, and submitting geodetic control data. This issue will be addressed by the Montana Geodetic and Mapping Control Standards Committee; participants include the National Geodetic Survey (NGS); the Bureau of Land Management (BLM); the Montana Department of Transportation (MDOT); the Montana Association of Registered Land Surveyors (MARLS); and the Montana Geographic Information Council (MGIC).

¹⁰⁹ The text of the 2001 Executive Order can be found at:
<http://www.discoveringmontana.com/itsd/policy/councils/mgic/mgic.asp>

The Montana Local Government GIS Coalition (MLGGC) Addressing Standards Group¹¹⁰ is in the process of developing a standard addressing model in order to enhance the potential for data sharing as well as to facilitate the integration of legacy record systems with GIS data. The Addressing Standards Group has posted a draft Addressing Data Model, revised as of January 22, 2003, to their website for review.¹¹¹

The *Montana Addressing Guidebook for Local Governments*, developed by the GIS Services Section and the 9-1-1 Program, contains a list of recommended tasks for creating physical addresses. Local addressing systems generally must conform to these guidelines if State 9-1-1 Program funds are to be used to help finance the project.

c. Issues and Opportunities

Overall, the land records modernization program has been extremely successful and the benefits have been numerous. The Montana State Library, which serves as a central organized repository for spatial data, is a significant benefit.

Technical impediments have been few. The biggest institutional impediment has been trying to standardize local data. In retrospect, methodologies for enhancing the accuracy of GCDB and thus the parcel layer should have been negotiated between BLM and the state earlier in the program. However, many technical elements, including the inability of GIS software to handle elegantly the linkage of control data and parcel data has hindered this effort. Recent developments, such as ESRI's Survey Analyst, may resolve some of these hurdles.

The key to the success of the Montana land records modernization programs has been the idea of state integration. Local participation is required, and funding is needed, but a state will not reap the benefits of local data unless they have a program of integration. In the future, much of the more dynamic spatial data will come from the local level. What is needed is a well funded, well organized strategy to integrate data. Fundamental elements include educational outreach and standards as well as grants-in-aid to local governments for spatial data development and technology implementation. It is critical that the GIS community persuades the State to make an investment in statewide coordination. Cost benefit examples from other states should be leveraged whenever possible.

¹¹⁰ Montana Addressing Standards Group website: <http://sun1.giac.montana.edu/localgov/AddressGroup.htm>

¹¹¹ Draft Addressing Data Model, January 2003: <http://sun1.giac.montana.edu/localgov/AddressingModel1.pdf>

4. Oregon

In the early 1950s, the Oregon legislature initiated a statewide reappraisal program. While this program did not address the mapping system, it did highlight the inadequacy of existing assessors' maps. Assessors' maps were not uniform across the state and, in some cases, not uniform within counties. The maps were incomplete, highly inaccurate, and out of date. Two decades later, digital cartographic methods began to catch on within county assessors' offices for tax lot and parcel mapping. But, it was not until 1997 that every county was brought up to statewide standards. Today, the Oregon Mapping (ORMAP) Program provides the impetus for the creation of a statewide parcel map and enables this information to be used in a multitude of applications beyond tax assessment.¹¹²

a. Administrative Structures/Coordination Structures and Procedures

In Oregon, land information is collected and maintained locally by a variety of offices, including the Assessor, Clerk, Recorder, Tax Collector, Property Assessor, Cartographer, County Surveyor, and Land Use Planning, and Public Works departments. However, nearly all other departments deal with land records information at some level.

Oregon has several organizations that guide statewide land records modernization efforts, including: 1) the Oregon Department of Revenue; 2) the Oregon Geographic Information Council (OGIC); 3) the GIS Program Leaders (GPL) group; 4) the OGIC Policy Advisory Committee (PAC); and 4) the Statewide GIS Coordinator and Geospatial Enterprise Office (GEO).

Statewide professional organizations such as the Oregon GIS Association (OGISA), the Oregon Association of County Engineers and Surveyors (OACES), the Oregon and SW Washington URISA Chapter (ORURISA), a local chapter of ASPRS, at least six regional GIS User Groups, and Women in GIS all provide guidance, education and training.¹¹³

Major state and federal land owners and administrators, and hence key custodians for parcel information, include the Oregon Department of Forestry, the Oregon Department of Transportation, and the Oregon Division of State Lands, as well as the U.S. Forest Service and the Bureau of Land Management (BLM). All of these agencies have local field offices. Unfortunately, no overall coordination exists for keeping track of these land records. However, the Geospatial Enterprise Office is coordinating the development of a public lands layer (1:24,000) that will be integrated with the private parcel database. To this end, GEO is conducting a pilot project in 2 counties.

The following descriptions of county officer functions were drawn from the Oregon Historical County Records Guide website.¹¹⁴ The Oregon Historical County Records Guide, a comprehensive descriptive inventory of selected records for Oregon's 36 counties, was developed by the Oregon Historical Records Project (OHRP) with

¹¹² Cartographic Unit Strategic Business Plan. 2002. Oregon Department of Revenue TCIS Section, July 2002, p. 2.

¹¹³ ORURISA and links to regional GIS User Groups: <http://www.orurisa.org/>

¹¹⁴ Oregon Historical Records Guide website: <http://arcweb.sos.state.or.us/county/cphome.html>

funding from the National Historic Publications and Records Commission (NHPRC). The original inventories were conducted between 1993 and 1994; the goal of this program is to conduct inventory updates on a five year cycle. The Guide is housed within the Oregon State Archives under the Oregon Secretary of State.¹¹⁵

The Oregon State Archive also maintains the following records: assessment and tax rolls in the county records, maps and program records regarding land use, land management and environmental issues in the state records, land claims, land use surveys, and land laws and legislation in the Provisional and Territorial records, and Donation Land Claim files in the federal records.

1) Property Assessor

"The assessor, elected to four year-terms, assesses the value of taxable property and enters that information into assessment and tax rolls. The assessor certifies tax levies and delivers tax rolls to the tax collector for collection. The office also maintains property ownership records and maps, receives budgets, and extends levies to other taxing districts such as library and sewage. The state, through statutes and administrative rules, sets most of the parameters related to the procedures involved in the assessment of property taxes in Oregon."¹¹⁶

2) Clerk

"The clerk historically was mandated by various Oregon laws to keep records dealing with bonds, vital statistics (births, deaths, marriage), elections (voters lists, nominations, candidates), registrations (businesses, farms names, physicians, nurses and other medical personnel), licenses, (medical, notaries, beekeepers), incorporations, animals (marks and brands, stallions, jacks), military (discharge of soldiers, sailors, and marines), finance (fees), reports (coroner), and liens (mechanic, chattel).

The county clerk is now required to maintain a lien record; records affecting the title of real property; a record and index of instruments filed such as those related to mortgage, bond, or judgment; a record and index to the platting of maps of towns, villages, and cemeteries; estate records; and other records such as financial statements, hospital and federal tax liens, cooperative contracts, special district assessments, lien foreclosure statements, and any other documents required or permitted to be filed with the county clerk.

The powers and functions of the clerk in relation to the circuit and district courts were transferred to the trial court administrator or trial court clerk when the state began operating these courts in 1983.

Home rule counties often distribute the duties of the clerk to separate functional offices such as elections and records. Office names and hierarchies vary greatly and are subject to change in home rule counties."¹¹⁷

¹¹⁵ Oregon State Archives website: <http://arcweb.sos.state.or.us/default.htm>

¹¹⁶ <http://arcweb.sos.state.or.us/county/cpctyoffhistcombo.html#Assessor>

¹¹⁷ <http://arcweb.sos.state.or.us/county/cpctyoffhistcombo.html#Clerk>

3) Recorder

"The Oregon Constitution provided for the election of a recorder of conveyances when the population of a county exceeded twelve thousand persons. Separate offices of the clerk of the county court and clerk of the circuit court could also be authorized...The recorder performed the duties formerly required of the county clerk to act as custodian of all records, deeds, mortgages, maps, plats, powers of attorney, and contracts affecting the title to real property.

By 1937 the office had been abolished in all counties except Linn, Marion, and Umatilla. Currently the recorder as a separate office has ceased to exist and the duties of a recorder are performed by the county clerk or by a designated official (typical in home rule counties)."¹¹⁸

4) Surveyor

"The surveyor, elected every four years, maintains records of boundary surveys by private and public surveyors, road surveys, subdivisions and partitioning surveys, major land corner field notes and reports, and elevation data. The office also provides a number of related functions such as surveys of county owned lands, county roads, preservation and restoration of major land corners, court-ordered surveys, crime scene investigation surveys, and inspection and review of subdivision plats.

Generally, the office must maintain records of all surveys made by the county surveyor and deputies, county road officials, and registered land surveyors (related to boundary monuments). The surveyor must make a survey of legal subdivisions and keep a separate record of all public land survey corners that have been established or reestablished. State law also requires the surveyor to keep copies of the U.S. Bureau of Land Management field notes and plats of all surveys and resurveys of public lands including townships, sections, Donation Land Claims, mineral claims, homesteads, and meander lines within the county."¹¹⁹

5) Cartographic Unit, Property Tax Division, Department of Revenue (DOR)

As put forth in the Strategic Business Plan (2002), the Department of Revenue Cartographic Unit's mission is "to oversee and participate in the development and maintenance of a uniform statewide, digital cadastral map system to facilitate and improve the administration of the ad valorem property tax system." The Cartography Unit is responsible for establishing statewide cadastral mapping standards and for assisting in the maintenance of individual assessor's maps.¹²⁰ To this end, the Cartographic Unit assists those counties that do not have cartographic staff with the daily maintenance of their taxlot maps (i.e., 15 out of 36 counties). The bulk of this work entails adding partition plats, new subdivisions, and property line adjustments to the existing maps. In addition, the Cartographic Unit assists counties with converting their county paper taxlot maps into digital format. The resulting countywide, seamless taxlot maps are used in geographic information systems (GIS). The Cartographic Unit also plays an essential role in the Oregon Mapping (ORMAP) Program.

¹¹⁸ <http://arcweb.sos.state.or.us/county/cpctyoffhistcombo.html#Recorder>

¹¹⁹ <http://arcweb.sos.state.or.us/county/cpctyoffhistcombo.html#Surveyor>

¹²⁰ Department of Revenue, Cartographic Unit website: <http://www.dor.state.or.us/proptax/cartog.html>

6) Division of State Lands (DSL)

The Division of State Lands¹²¹ (DSL) is the administrative arm of the State Land Board. The State Land Board, and hence the Division of State Lands, is responsible for the management of “state-owned lands, assets in the Common School Fund, offshore lands and coastal estuarine tidelands, submerged and submersible lands of the navigable waterways within the state, unclaimed property, and estates with no heirs.” In total, DSL manages about 784,000 acres of uplands, 650,000 acres of range and agricultural land, and more than 2,000 acres of other lands statewide.

DSL is divided into three sections: Field Operations, Policy and Planning, and Finance and Administration, in addition to the Director's Office and South Slough Reserve. The Policy and Planning Section maintains all state land ownership records. The Information Systems Unit, a subdivision of Policy and Planning, supports “a variety of database systems that provide subsidiary records for agency programs including unclaimed property, accounting, permits, violations, leases, capital inventory, and mailing lists.” The Land Administration System is the unified corporate database. The GIS program maintains a public lands layer, which depicts agency property, including surface and subsurface ownership. The GIS program also keeps inventories of wetlands and of improvements to the state-owned waterways, in addition to mapping removal-fill permitting activities.

7) Oregon Geographic Information Council (OGIC)

The Oregon Geographic Information Council (OGIC) has a long and complex history. As early as 1912, the State of Oregon acknowledged the need for statewide coordination of mapping activities with the creation of the Oregon State Map Advisory Council (SMAC). Subsequent Executive Orders in the 1980s expanded SMAC’s role to include statewide coordination of mapping, land records management and geographic information activities [Executive Order No. EO-83-15; Executive Order No. EO-87-11]. The 1989 Executive Order charged SMAC with developing a statewide GIS plan, with establishing spatial data standards, and with providing direction to the newly created State Service Center for Geographic Information Systems (SSCGIS) [Executive Order No. EO-89-16]. Members of SMAC were appointed and drawn primarily from natural resource agencies.

In 1994, Governor Barbara Robert’s Executive Order EO-94-16 reorganized and renamed SMAC as the Oregon Geographic Information Council (OGIC), in addition to broadening its representation to include human resource and public safety agencies. In February 2000, OGIC was reorganized and strengthened with Executive Order No. EO-00-02. In its most recent incarnation, OGIC is a policy group comprised of agency directors with the authority to act on behalf of their agencies.¹²² For a detailed history of SMAC and other coordinating agencies in Oregon, refer to Warnecke et al. (2000).

The 2000 Executive Order continues the Oregon Geographic Information Council (OGIC) and assigns it the following tasks:

- “Provide leadership within state government regarding the accumulation, dissemination, analysis, and management of geographic information, including, but not limited to:

¹²¹ DSL website: <http://statelands.dsl.state.or.us/aboutdsl.htm>

¹²² Executive Order E0-00-02: <http://www.kitzhaber.oregon.us/governor/legal/execords/eo00-02.pdf>

- Advocacy before the Oregon Legislative Assembly, United States Congress, county commissions, city councils, and the private sector;
 - Exploration of “best practices” relating to geographic information, while determining if such practices are applicable to Oregon;
 - Creation and promotion of a statewide mission for geographic information; and
 - Direction of that statewide mission through work with the Legislative Assembly, the Federal Geographic Data Exchange Group, and units of local government.
- Provide a statewide forum for all geographic information issues. In providing such a forum, the OGIC shall:
 - Encourage the involvement of all parties potentially affected by geographic information issues;
 - Function as the primary point of contact on discussions regarding geographic information issues affecting state agencies; and
 - Facilitate the free flow of information between interested parties.
- Fulfill a policy, planning, and assessment role regarding geographic information issues, including:
 - Conduct an ongoing review of statewide geographic information systems, as well as oversight of GIS, in coordination and consultation with the Information Resources Management Division of the Department of Administrative Services (DAS);
 - Prioritization of geographic information initiatives;
 - Development of geographic information guidelines and standards to be adopted by the Information Resource Management Council; and
 - Provide advice to DAS on budget decisions regarding implementation of GIS functions.
- Promote coordination and partnerships among federal, state, and local government entities regarding geographic information issues.

The OGIC consists of the Directors, or policy-level alternates, of the following governmental bodies:

- The Department of Agriculture, the Department of Environmental Quality, the Department of Fish and Wildlife, the Department of Forestry, Parks and Recreation Department, the Department of Human Resources, the Department of Transportation, the Department of Revenue, the Oregon Economic and Community Development Department; the Water Resources Department; the Department of Geology and Mineral Industries, and the Division of State Lands;
- The Secretary of State’s Office; and
- The Governor’s Office;
- Additionally, the OGIC shall consist of the statewide coordinator for GIS.”

8) Geospatial Enterprise Office (GEO) and Statewide GIS Coordinator, Information Resources Management Division (IRMD), Department of Administrative Services (DAS)

The Statewide GIS Coordinator and staff provide support to the Oregon Geographic Information Council and Policy Advisory Committee. The GIS Coordinator and Geospatial Enterprise Office also provide administrative support to OGIC and all OGIC groups, coordinate facilities and support work of committees, and carry out the technical, administrative, and outreach work necessary to meet OGIC goals. The Geospatial Data Clearinghouse is under direct supervision of the GIS Coordinator.¹²³

9) GIS Program Leaders Group (GPL)

The GIS Program Leaders (GPL) group serves as the technical advisory committee to the Oregon Geographic Information Council and provides a technical level forum for state agencies to exchange information, share expertise and address technical problems.¹²⁴ Membership in GPL is voluntary.

10) Policy Advisory Committee (PAC)

The Policy Advisory Committee (PAC)¹²⁵ provides strategic planning, budgetary, and policy development the Oregon Geographic Information Council. PAC members are by appointment of an OGIC member. The Statewide GIS Coordinator serves as the Chair.

11) Geospatial Data Clearinghouse (OGDC), Department of Administrative Services (DAS)

The Oregon Geospatial Data Clearinghouse¹²⁶ (OGDC) is a section of the Information Resource Management Division of Oregon's Department of Administrative Services. Under the direction of the Statewide GIS Coordinator, the OGDC is responsible for: 1) the development, maintenance, and hosting of Oregon's Digital Spatial Data Library; 2) the communication of GIS initiatives among local, regional, and state agencies; and 3) assistance with coordination of GIS activities for Oregon state agencies.

12) Framework Implementation Team (FIT)

The Framework Implementation Team (FIT),¹²⁷ formerly the Oregon Geographic Framework (OGEOF) Committee, was reorganized in November 2000 as a technical work group under the Oregon Geographic Information Council. FIT promulgates the goals and objectives of the national framework implementation effort, led by the Federal Geographic Data Committee (FGDC) and the Office of Management and Budget (OMB). Currently, FIT is coordinating the development of the seven framework data themes identified by the FGDC and six additional data themes specific to Oregon.

¹²³ Oregon Strategic Plan for Geographic Information Management. 2001. Oregon Geographic Information Council June 5, 2001. <http://www.sscgis.state.or.us/coord/ogic.htm>

¹²⁴ GPL Website: <http://www.gis.state.or.us/coord/state.html>

¹²⁵ PAC Website: <http://www.gis.state.or.us/coord/PAC.html>

¹²⁶ Oregon Geospatial Data Clearinghouse website: <http://www.gis.state.or.us/index.html>

¹²⁷ FIT website: <http://www.gis.state.or.us/coord/ogeof.html>

13) Task Force on Surveying/GIS/Mapping

After examining the relationships between land surveying, cartography, photogrammetry, and geographic information systems, the Task Force on Surveying/GIS/Mapping¹²⁸ is supporting certification and licensing of GIS professionals, supporting the proposed GIS/LIS addendum to the NCEES Model Law, supporting the adoption of the FGDC metadata standard, recently adopted by OGIC, and supporting a disclaimer, recently adopted by OGIC, for maps and data produced with GIS technology..

14) Oregon GIS Association (OGISA)

The Oregon GIS Association's mission is "to increase the knowledge and ability of GIS Coordinators in Oregon, to promote the exchange of information among members and the GIS community, to promote the Association's unique perspectives, to influence State and Federal GIS strategies and legislation, and to promote the establishment of data structure and metadata guidelines and standards."¹²⁹

b. Control Structures

1) Policies

a) Geographic Reference Framework

The Oregon Mapping Project has defined a level of accuracy for parcel information and determined the corresponding geodetic control needed to achieve that accuracy. ORMAP provides grants to counties for the densification of geodetic control. To date, 4 or 5 counties have availed themselves of this opportunity. Otherwise, there is no statewide coordination of the geographic reference framework.

b) Parcel Specific Information

County Property Assessors annually provide the Department of Revenue with their parcel attributes databases. In addition, each county sends a set of scanned images of their assessment maps to the Oregon Geospatial Data Clearinghouse quarterly for posting to the ORMAP website. The Department of Revenue digitally maintains the assessment maps for 15 of the 36 counties in Oregon.

Twenty-seven counties manage their parcel data using GIS. Roughly 55% of the state's 1,616,119 parcels have been converted to GIS.

c) Oregon Map (ORMAP) Project

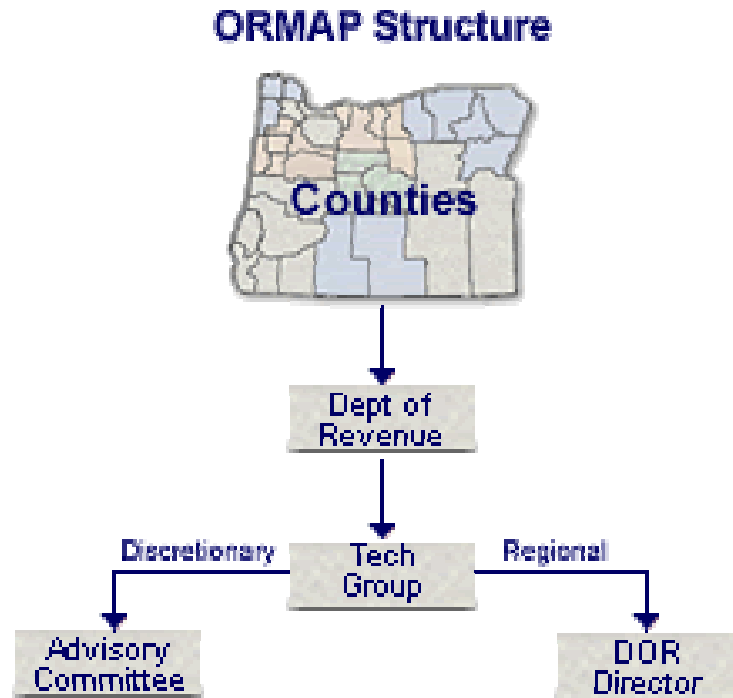
Through a series of pilot projects conducted from 1995 to 1998, the Oregon Department of Revenue developed the concept for the Oregon Mapping Program (ORMAP) in partnership with county cartographers, the Oregon GIS Association (OGISA), and the Oregon Association of County Engineers and Surveyors (OACES). The ORMAP environment contains three components: 1) digital maps of taxlots, taxcodes, and basic taxing districts; 2) digital images

¹²⁸ Task Force on Surveying/GIS/Mapping: http://www.gis.state.or.us/coord/task_force.html

¹²⁹ Oregon GIS Association website: <http://www.orurisa.org/ogisa/ogisa.htm> Note: This website has not been updated since 9-21-00.

representing the standard assessor's taxlot map; and 3) digital tables containing descriptions of taxlots. The Department of Revenue administers ORMAP with the assistance of the ORMAP advisory and technical committees (Figure 3).

Figure 3: ORMAP Structure¹³⁰



ORMAP has established four benchmarks for the program over the next five years:

- “By April of 2002, Oregon will have a statewide easily accessible digital base map system that provides picture images of assessor maps and a limited amount of information;
- By October of 2004, Oregon will have a statewide “tax lot map” digital system that supports a limited number of GIS applications. Ten percent of the parcel maps are used by the assessors’ as tax lot maps;
- By October of 2006, Oregon will have a statewide digital “tax lot map” digital system that supports a wide variety of GIS applications. Fifty percent of the parcel maps are used by the assessors’ offices as tax lot maps;
- By October of 2008, Oregon will have a statewide digital property tax map system that supports a broad array of public and private GIS applications. Emphasis will be on increased map accuracy and on access to assessment and other public and private data bases.”¹³¹

¹³⁰ <http://www.ormap.org/structure.htm#regional>

¹³¹ <http://www.ormap.org/goals.htm>

d) Oregon Framework Data Initiative

As described above, the Framework Implementation Team (FIT) promulgates the goals and objectives of the national framework implementation effort, led by the Federal Geographic Data Committee (FGDC) and the Office of Management and Budget (OMB). Currently, FIT is coordinating the development of an implementation plan and standards for the seven framework data themes identified by the FGDC, as well as six other data themes specific to Oregon (Table 3: Oregon Framework Data Initiative Data Themes). The Framework Data Initiative pulls together twelve committees and over 200 people.

Table 3: Oregon Framework Data Initiative Data Themes

FGDC Framework Data	Oregon Priority Data Sets
Cadastral	Bioscience
Digital Orthoimagery	Climate
Elevation & Bathymetry	Cultural
Geodetic Control	Land Cover/Use
Governmental Units	Utilities
Hydrography	Geoscience
Transportation	

The Transportation Data Theme will include a statewide street centerline file that is updated locally and integrated with state highways and federal resource roads. The Oregon Emergency Management Department's (OREMD) E-911 funding will be tapped for this effort.

The State of Oregon holds a contract with a commercial vendor to process 2000/01 NAPP aerial photography so as to produce 1-meter resolution, black and white digital orthophoto quads (DOQs) in three different projections. State agencies want the DOQs in the State's customized Lambert projection; federal agencies want the DOQs in UTM; and local governments want the DOQs in State Plane. OGIC is purchasing 156 images at a cost of \$541/DOQ, for which the OGIC has set aside \$100,000 in the 2003-2005 biennium. The remaining images will be purchased by county governments¹³² and by the BLM, Forest Service, and USGS [i.e. 1,983 images in total at a cost of roughly \$1.1 million dollars].

2) Legal Framework

a) Oregon Geographic Information Council

Executive Order No. EO 83-15 established the State Map Advisory Council (SMAC) and Executive Order No. EO 87-11 expanded its responsibilities.

¹³² County governments are using Title 3 federal money to purchase the imagery. This money comes from a government reimbursement for the loss of timber sales resulting from the implementation of the 1996 Forest Plan.

Executive Order No. EO 89-16 charged SMAC with establishing a statewide GIS plan, with developing standards and procedures for digital map data, and with providing direction to the State Service Center for Geographic Information Systems. Executive Order No. 94-16 renamed SMAC the Oregon Geographic Information Council and broadened the membership to include the human resource and public safety agencies. Executive Order No. 96-40 reaffirmed the Council's role and responsibilities.

In February 2000, OGIC was reorganized and strengthened with Executive Order No. EO-00-02. The 2000 Executive Order defines OGIC's responsibilities and membership. In addition, this Order specifies that "[s]tate agencies shall coordinate GIS mapping, and other geographic information activities with the OGIC, the Oregon Spatial Library, and other local and federal agencies. Where appropriate, state agencies shall:

- Create and maintain geographic data themes, and provide updates or linked web site access of that data to the Oregon Spatial Library on a schedule to be determined by the Information Resources Management Division;
- Share information through the OGIC, and the GIS Coordinator, regarding projects involving geographic information and related systems technology;
- Coordinate with the OGIC, and the GIS Coordinator, before making decision about planning and development of projects involving the acquisition of geographic data, hardware, or software;
- Participate in the review and updating of an Oregon Geographic Information Council Plan, and adhere to the policies and standards established in the Plan..."

b) Land Surveyors

The Oregon statutes¹³³ strongly regulate surveying activities. ORS 672.005(2) provides, in part:

(2) "Practice of land surveying" means that branch of the practice of engineering in which: (a) Surveys are made to determine area or topography, to establish or reestablish land boundaries, corners or monuments or to subdivide or plat land; (b) Surveys are made to establish lines, grades or elevations, or to determine or estimate quantities of materials required, removed or in place; (c) Surveys are made for horizontal or vertical mapping control or geodetic control; or (d) Consultation, investigation, evaluation or planning relating to land surveying matters is required.

In addition, the statutes similarly provide:

ORS 672.045: Prohibited activities relating to practices of engineering and land surveying.

¹³³ <http://www.gis.state.or.us/coord/survey/SurveyDefinitions.pdf>

A person shall not: (1) Engage in the practice of engineering or land surveying without having a valid certificate or permit to so practice issued in accordance with ORS 672.002 to 672.325.

92.010 Definitions for ORS 92.010 to 92.190. As used in ORS 92.010 to 92.190, unless the context requires otherwise:

(10) "Property line" means the division line between two units of land.

(11) "Property line adjustment" means the relocation of a common property line between two abutting properties.

As result, any boundary determinations or property line adjustments must be made by a registered land surveyor or under the direction of a registered land surveyor. This has implications relative to the development of parcel based geographic and land information systems.

c) Taxlots/Tax Districts - ORMAP¹³⁴

Relevant portions of the Oregon statutes are reproduced in Appendix B: Selected Oregon Statutes Relating to Land Information. Key points found in these statutes include:

ORS 306.132 Oregon Land Information System Fund.

(1) The Oregon Land Information System Fund is created, separate and distinct from the General Fund.

(2) Moneys in the Oregon Land Information System Fund are continuously appropriated to the Department of Revenue for the purpose of funding a base map system to be used in administering the ad valorem property tax system. [1999 c.701 s.7]

308.225 Boundary change or proposed boundary change; procedure.

(2)(a) If a boundary change is made or proposed, the person, governing body, officer, administrative agency or court making the determination that the boundary change is final shall file with the county assessor and the Department of Revenue the legal description of the boundary change or proposed change and an accurate map showing the change or proposed change in final approved form, prior to the next March 31.

308.245 Maps; taxpayers' index.

(1) The assessor of each county shall maintain a set of maps upon which are outlined the boundaries of each land parcel subject to separate assessment within the county, with the parcel's tax lot or account number shown on the parcel. In addition, the assessor may show on the maps the code area boundaries and the assigned code area numbers.

¹³⁴ <http://www.gis.state.or.us/coord/survey/MappingStatutes.pdf>

d) Zoning and Comprehensive Plans

Statutes governing Zoning and Comprehensive Plans directly affect geographic and land information systems. Example statutory provisions follow:

Statute 197.010 Policy (Comprehensive Plan)

(1) In order to assure the highest possible level of liveability in Oregon, it is necessary to provide for properly prepared and coordinated comprehensive plans for cities and counties, regional areas and the state as a whole. These comprehensive plans:

197.015 Definitions for ORS chapters 195, 196 and 197 (Comprehensive Plan)

(5) "Comprehensive plan" means a generalized, coordinated land use map and policy statement of the governing body of a local government that interrelates all functional and natural systems and activities relating to the use of lands, including but not limited to sewer and water systems, transportation systems, educational facilities, recreational facilities, and natural resources and air and water quality management programs. "Comprehensive" means all-inclusive, both in terms of the geographic area covered and functional and natural activities and systems occurring in the area covered by the plan. "General nature" means a summary of policies and proposals in broad categories and does not necessarily indicate specific locations of any area, activity or use. A plan is "coordinated" when the needs of all levels of governments, semipublic and private agencies and the citizens of Oregon have been considered and accommodated as much as possible. "Land" includes water, both surface and subsurface, and the air.

3) Funding and Costs

GIS Coordination and the Oregon Geospatial Data Clearinghouse are funded by all state agencies through an assessment plan that nets approximately \$1.5 million per biennium.

As stated above, the Department of Revenue administers ORMAP, with the assistance from the Technical and Advisory Committees. Both the Technical and Advisory Committees represent the stakeholders of the base mapping system and include participants from local, state and federal agencies, the private sector, and other interested parties.

Funding for the program is generated through a \$1 per document recording and filing fee, which is collected by the counties and deposited into the state fund on a quarterly basis.¹³⁵ These fees generate about \$200,000 - \$300,000/quarter statewide. After Department of Revenue administration expenses are deducted (about 7%), the remaining money is divided equally into two funding programs, regional and discretionary.

To support the development of a seamless basemap system, ORMAP divides the state into nine regions and appoints regional coordinators to each. The Regional

¹³⁵ ORMAP funding: <http://www.ormap.org/structure.htm#regional>

Funding Program funds are distributed amongst these regions based on the following factors:

- “Percentage of total contributions per county;
- Square miles per county;
- Number of tax lots per county; and
- 10% equal distribution per county.”

To apply for regional funds, counties may submit grant proposals, which are first reviewed by the regional coordinator before being reviewed by the DOR, and subsequently by the technical committee. The DOR Director approves or rejects these proposals after reviewing the technical committee’s recommendations.

The Discretionary Funding Program, on the other hand, funds individual county projects. Discretionary proposals are reviewed by both the technical and advisory committees, before going to the DOR Director for approval. Since its inception, the Discretionary Fund has distributed \$880,374.25 in grants to counties.¹³⁶

There is some concern regarding the effectiveness of the Regional Funding Program in achieving regional coordination goals. Operationally, the program has functioned more like the Discretionary Funding Program.¹³⁷ Edge-matching between county boundaries is a critical area in need of attention. However, it is hoped that a new ORMAP Project Coordinator will work with counties to ensure that they are meeting the program’s goals, as well as strengthen the ties between DOR, the counties and the regions.

4) Standards

State agencies in Oregon utilize ten different map projection systems. To address this issue, GPL proposed a Projection Transfer Standard in 1996, which recommends that all state agencies should include projection metadata when sharing spatial data and should use an Oregon-centered Lambert projection when publishing spatial data.¹³⁸

As part of the Framework Data Initiative, four standards forums will be held over the next two years. The standards development and adoption process is depicted in Figure 4. To the extent possible, standards will incorporate existing federal standards (e.g., FGDC Cadastral Standard, FGDC Geodetic Control Standard). The GIS community will be asked to review proposed standards before adoption.¹³⁹ Standards are in place for the Hydrography and Elevation data themes. Standards for Metadata and Orthoimagery were recently adopted by OGIC after presentation and acceptance at the first community standards forum. The specifications for ORMAP’s structure serve as the standard for digital parcels.¹⁴⁰

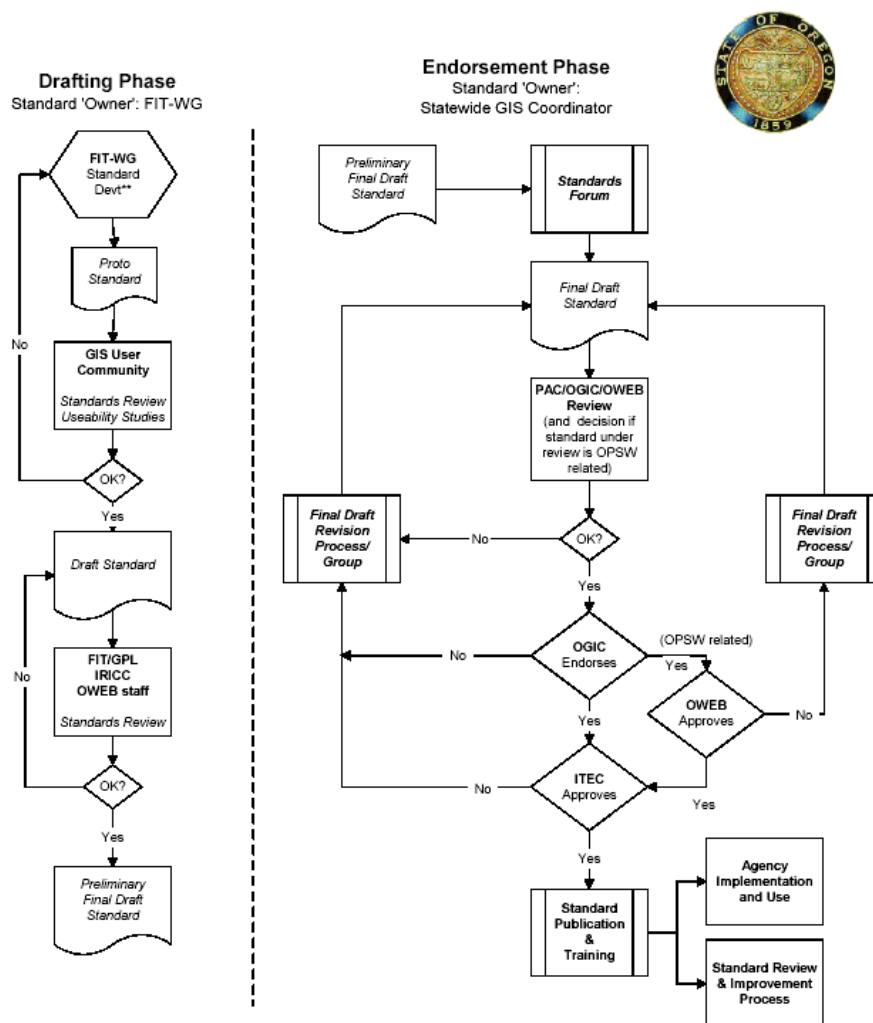
¹³⁶ Discretionary Fund Financial Report 3rd Quarter of 2002: <http://www.ormap.org/financial/2002/02-3Q-September/ORMAP%20Funding%20Reports-11-26-02.htm>

¹³⁷ Advisory Committee Meeting Notes October 24, 2002: <http://www.ormap.org/advcomm/minutes/2002/10-24-2002.htm>

¹³⁸ <http://www.gis.state.or.us/coord/project/gpl.html>

¹³⁹ Oregon Framework Data Initiative Standards: <http://www.gis.state.or.us/coord/standards.html>

¹⁴⁰ ORMAP structure <http://www.ormap.org/datastructure.htm>

Figure 4: Oregon Data Standards Development and Adoption Process¹⁴¹

c. Issues and Opportunities

A key factor to the success of the Oregon Mapping Program (ORMAP) is its administrative structure. The Department of Revenue (DOR) administers ORMAP and the grants program. Nonetheless, local governments have a tremendous amount of control over how the program operates. Although not required by statute, the DOR felt that having local input was critical to the success of ORMAP and thus, it created the Advisory and Technical Committees. The ORMAP Advisory Committee, which is comprised of federal, state, local, and private sector representatives, allows local governments to have a voice in setting program priorities and in determining how the money should be allocated.

¹⁴¹ http://www.gis.state.or.us/coord/standards/Standards_Development_Effort.pdf

An impediment to the program is that the DOR Cartographic Unit has been slow to adopt GIS technology. Thus, the program has tended to focus more on the cartographic/hardcopy products and less on the underlying database that is needed.

The State GIS Coordinator and GEO hope to use the statewide parcel map as a primary base map for all other Framework themes. Several state agencies will benefit greatly from having a statewide parcel data set to support their business functions. For example, the Parks and Recreation Department needs parcel data to process applications for development so that they can ensure that such development is not occurring on historically protected lands or archaeological sites. Economic & Community Development needs parcel data to encourage businesses and industry to develop on land that is not restricted for such development.

Two additional areas of opportunity include: 1) data sharing and coordination with federal agencies; and 2) Homeland Security. Roughly 50% of the state is managed by federal agencies (e.g., BLM, USFS, USGS, FW); therefore, the integration of public ownership with the private ownership database will be important to future applications.

5. Tennessee

In 1962/1963, the Tennessee Comptroller of the Treasury manually created parcel maps for all 95 counties in the State using a common indexing scheme. By 1967, the Tennessee General Assembly established the Division of Property Assessments (DPA), under the office of the Comptroller of the Treasury, to supervise the statewide mapping and reappraisal programs. Over the last three decades, the DPA has been given additional responsibilities, including “oversight and administration of the Property Tax Relief Program, the technical and professional training for state and county assessment personnel, the personal property program, the support and service of the computer appraisal system, appraisal ratio studies and current value updating to those initial responsibilities.”¹⁴²

Efforts in statewide GIS coordination began in the early 1980’s with the Governor’s Safe Growth Team and with the subsequent formation of a committee mandated by the FY1983-84 General Appropriation bill to study statewide GIS activities and needs. Both entities advocated the establishment of a GIS and Remote Sensing center at the Tennessee Wildlife Resources Agency (TWRA). In addition, the committee encouraged the creation of a GIS Users Committee, which was chaired by the State Planning Office.¹⁴³

After a comprehensive survey of statewide GIS activities in 1987, interest grew in moving DPA’s statewide mapping efforts into the digital arena. In 1996, the Comptroller of the Treasury initiated a pilot program in two counties as a precursor to the development and implementation of a statewide parcel-mapping program.¹⁴⁴ Even so, the concept did not catch on with the legislature immediately and statewide GIS coordination activities remained largely informal until the late 1990s. Finally, in 1998 the Legislature established a GIS Study Committee to investigate cost-recovery options for GIS data development and use.¹⁴⁵ A year later, the Legislature authorized and provided funding for the Tennessee Geographic Information System (GIS) Base Mapping Program, described below.

a. Administrative Structures/Coordination Structures and Procedures

In Tennessee, land information is collected and maintained locally by a variety of offices, including the Clerk, the Treasurer, the Register of Deeds, the Assessor of Property, the Cartographer, County Surveyor, and Planning and Development departments. The Assessor of Property’s Office is often the de facto lead agency for overall local land records coordination, but in some cases the Planning Department or municipal engineers’ office serve as the coordinating entity. County and Municipal Technical Assistance Services (CTAS and MTAS) also assist county and municipal governments with modernization efforts.

Tennessee has several organizations that guide statewide land records modernization and GIS coordination. The Division of Property Assessment (DPA), under the

¹⁴² Tennessee Division of Property Assessments. 2002. *Annual Report to the State Board of Equalization*, June 30, 2002. Nashville, Tennessee: Tennessee Division of Property Assessments, Office of the Comptroller.

¹⁴³ Warneke, L. 2000. NSGIC State Profiles: Tennessee.

¹⁴⁴ Office for Information Resources. 1998. *Executive Summary, Statewide GIS Base Mapping Program Business Plan*, July 17, 2998. Nashville, Tennessee: Office for Information Resources. <http://gis.state.tn.us/>

¹⁴⁵ Warneke, L. 2000. NSGIC State Profiles: Tennessee.

Comptroller of the Treasury within the Legislative Branch, has legislative oversight over the entire assessment process at the state level and has auditory authority over all local and county government. The Office of Local Government within the Comptroller of the Treasury is responsible for Legislative reapportionment, for which it provides GIS mapping services.

The GIS Services Division of the Office of Information Resource (OIR) within the Department of Finance and Administration provides leadership and coordinates GIS activities across all state agencies and departments. Furthermore, the GIS Services Division oversees the Tennessee Geographic Information System (GIS) Base Mapping Program. In addition to the GIS Services Division, Tennessee has both a State Surveyor and State Geographer, although their responsibilities are limited.

The Office of Real Estate Management Services within the Department of Finance and Administration manages land records for all state owned properties. The Tennessee Department of Transportation manages local roads information and data, while the Emergency Communication Board is responsible for street addressing information. The Tennessee Valley Authority, a federal corporation, manages land records for 11,000 miles of shoreline in the Tennessee River system.

Statewide professional organizations such as the Tennessee Geographic Information Council (TNGIC), Tennessee Association of Assessing Officers (TNAAO), the Tennessee Association of Professional Surveyors (TAPS), and the Tennessee Registers of Deeds Association also provide guidance, education and training.

A variety of GIS user groups exist in Tennessee, including: ET Map Info Users Group, Oak Ridge/Knoxville Area ESRI Users Group, Middle Tennessee GIS Users Group, Clarksville-Montgomery County GIS Users Group, Intergraph Users Groups, West Tennessee GIS Users Group, the State GIS Users Group, and the TN Federal GIS Users Group. The Tennessee Federal GIS Users Group distributes spatial data layers that are shared among Federal, state and local GIS facilities through their website.¹⁴⁶

1) County Assessor of Property

The County Assessor of Property in Tennessee is a constitutionally elected official who serves a four-year term of office. The assessor discovers lists, classifies and values all property, and compares information collected about a property to all similar properties. The assessor is also responsible for maintaining up-to-date parcel maps. Some counties have adopted GIS for this purpose. The digital maps are updated to reflect new subdivisions, surveys, property splits and the combining of parcels as they occur, and then paper maps are printed for reference and public viewing. In some cases, the computer-assisted mass appraisal (CAMA) data base, which contains all of the detailed property information about each parcel (ownership, sales history, improvements, etc.), is linked to the GIS parcel layer.

2) County and Municipal Technical Assistance Services

The Municipal Technical Assistance Services (MTAS) was created in 1949 by T.C.A. 67-6-03 to provide technical assistance to incorporated cities in Tennessee. Similarly, the County Technical Assistance Service (CTAS) was created in 1973 by

¹⁴⁶ Tennessee Federal GIS User Group website: <http://63.148.169.50/>.

T.C.A. 49-4-02 at the urging of county officials and their organization, the Tennessee County Services Association (TCSA), to provide prompt, daily technical assistance to each of the 95 counties in the state. Both entities are agencies of the Institute for Public Service at the University of Tennessee.

CTAS mission is “to promote better county government through the provision of direct assistance to county officials in developing and implementing ideas and methods for improving service to citizens within the legal framework of the Tennessee Constitution and laws enacted by the Tennessee General Assembly.”¹⁴⁷ The authorizing legislation directs CTAS to provide technical, consultative, and field services in accounting, fiscal administration, tax assessment and collection, improvements and public works, as well as many other matters relating to county government. Eight regional offices cover the state.

Over the last 2-3 years, the CTAS role has expanded as county governments consider GIS implementation. While MTAS have had little involvement with GIS implementation over the last 3-5 years, their role is likely to expand in the future.

3) Division of Property Assessments (DPA), Tennessee Comptroller of the Treasury

As mentioned above, in 1962 the Comptroller of the Treasury manually created parcel maps for all 95 counties in the State using a common indexing scheme and coordinate system. The Division of Property Assessments (DPA) was established in 1967 under the Comptroller of the Treasury within the Legislative Branch (Figure 5: Tennessee Organizational Chart). Until 1977, the DPA’s primary mandate was the supervision of the mapping and reappraisal programs (see T.C.A. 67-1-102 and T.C.A. 67-1718).

Today, the DPA is “responsible for assisting local governments in assessment of property for tax purposes throughout the state, monitoring the Statewide Reassessment Program, administering reappraisal grants to counties, conducting the Statewide Biennial Appraisal Ratio Study, coordinating the State Computer Assisted Appraisal System (CAAS) and tax billing materials produced from it, coordinating Defense of Value Appeals at the state level and drafting property ownership maps,” among other duties.¹⁴⁸ The Division of Property Assessment maintains property ownership (parcel) maps for 80 of the 95 counties.¹⁴⁹ The remaining counties maintain their own parcel maps.

The Division of Property Assessments is divided into two major areas – Field Operations and Administration. Administration is divided into six sections of expertise: Administrative Services, Legal, Personal Property, Mapping, Tax Relief and Training. Field Operations is comprised of four geographic areas, which

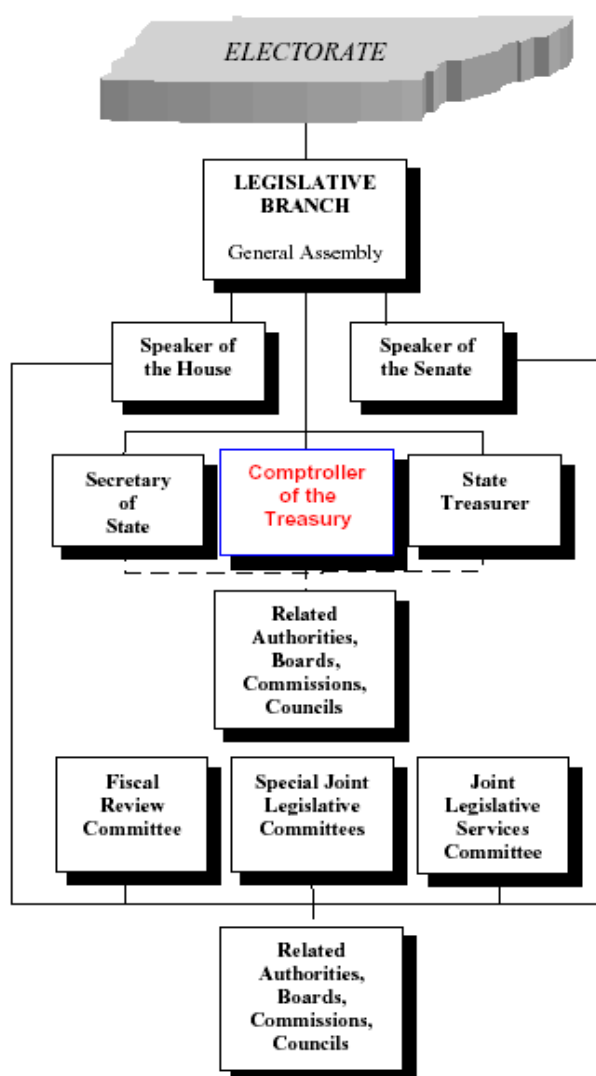
¹⁴⁷ CTAS website: <http://www.ctas.utk.edu/>

¹⁴⁸ Division of Property Assessment, 2002 Annual Report

¹⁴⁹ “Property ownership maps delineate all parcels of real property in a county, with their identifiers (parcel numbers) and area. Other important physical features such as highways, creeks, trees and improvements are also shown.” Division of Property Assessment, 2002 Annual Report

contain nine regions. A specific breakdown of responsibilities can be found in the Annual Report to the State Board of Equalization (2002, 5).¹⁵⁰

Figure 5: Tennessee Organizational Chart



In order to promote the concept of a statewide base mapping effort, the Division of Property Assessment and the Office of Local government conducted a pilot project involving two counties during 1996-97. As a lead agency in the Tennessee Base Mapping Program, the DPA is instrumental in developing awareness of the program through its interaction with county assessors. The DPA will be responsible for coordinating the maintenance of the parcel maps; it will provide

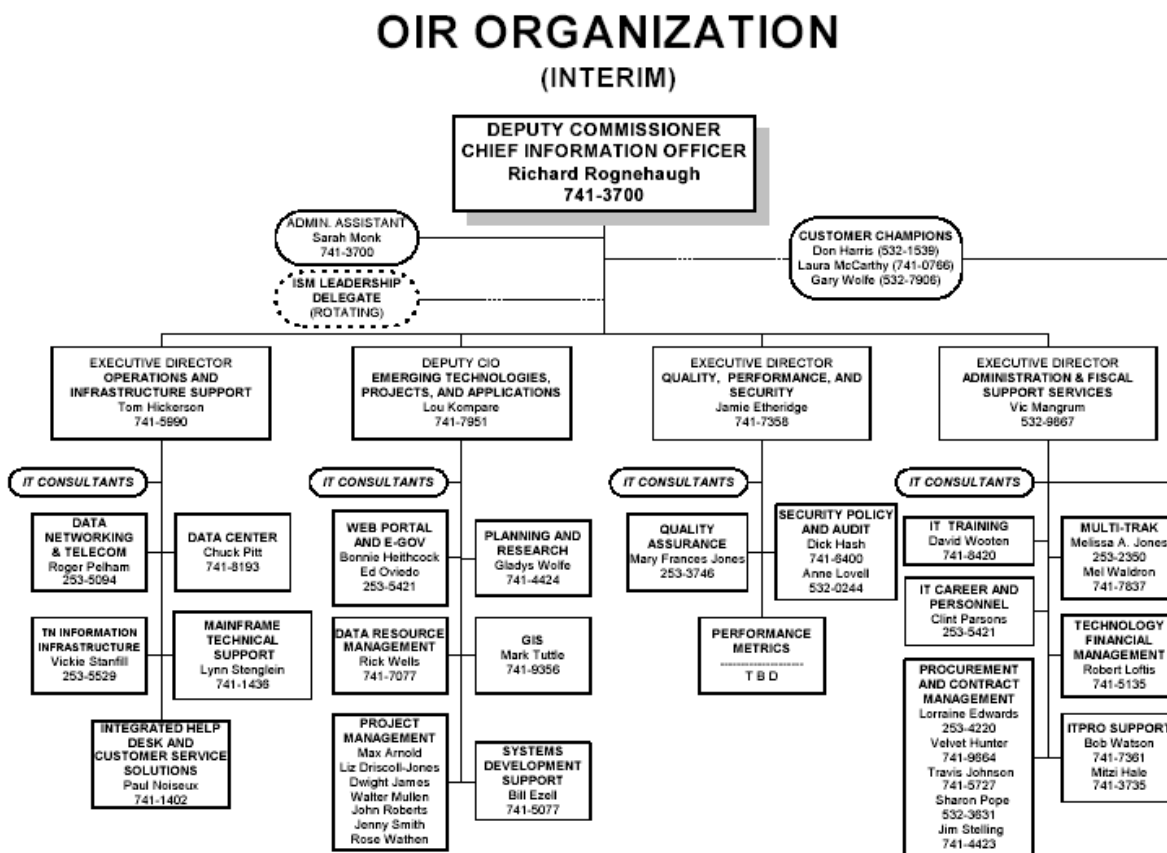
¹⁵⁰ Annual Report to the State Board of Equalization. 2002. Office of the Comptroller and Division of Property Assessments. June 30, 2002. <http://www.comptroller.state.tn.us/pa/2002annrept.pdf>

assistance for counties wishing to maintain the maps locally and will maintain parcels for the rest.¹⁵¹

4) GIS Services Division, Office of Information Resources (OIR)

The Office of Information Resources (OIR) is a division of the Department of Finance and Administration, within the Executive Branch (Figure 5). The OIR serves as staff to the Information System Council (ISC) and as such, provides technical direction, services and infrastructure for information technology use and development by state departments and agencies. Created by Executive Order in October 1983, the ISC oversees all state information technology matters [Acts 1923, ch. 3, § 1; Shan. Supp., § 226a1; Code 1932, § 167; T.C.A. (orig. ed.), § 3-201].¹⁵²

Figure 5: Office of Information Resources Organizational Chart



Created in 1997 within the Office for Information Resources, the GIS Services Division acts as the lead coordinator for GIS activities across all state agencies and serves as facilitator for intergovernmental cooperation and fiscal sharing between local, state and federal governments. Its mission is “to provide technical,

¹⁵¹ DPA GIS Profile: <http://gis.state.tn.us/library/InAction/State/dpa.htm>

¹⁵² ISC Website: <http://www.state.tn.us/finance/oir/policy/isc/isc.htm>

management, and administrative consulting, data provision, application development and implementation services of spatial information.”¹⁵³

Current efforts of this agency include oversight of the Tennessee Geographic Information System (GIS) Base Mapping Program, an initiative to develop a comprehensive and common digital basemap for the entire state consisting of digital orthophotography and a digital parcel database. In addition, GIS Services is working with the Tennessee Emergency Communication Board towards the provision of a uniform statewide intelligent street centerline layer.

5) Office of the State Geographer

The State Geographer, created under TCA § 4-43-101, is appointed by the governor to “be available at all times to serve as a consultant, advisor or director of research on geographic matters of interest to, and at the request of, appropriate officials in state government on a task-by-task contract basis” [Acts 1993, ch. 274, § 2]. The State Geographer serves a term of three years at the pleasure of the Governor without staff, expenses, or salary [TCA § 4-43-101 through 4-42-105]. This position, however, has not been filled in many years.

6) Office of the State Surveyor

7) Office Real Estate Management Services, Tennessee Department of Finance and Administration

The Tennessee Department of Finance and Administration (DFA) is the title holder of all state owned lands. The Office of Real Estate Management¹⁵⁴ within the DFA is responsible for the acquisition and disposal of any interest held in real property by the State of Tennessee, except for highway rights of way, which are the exclusive purview of the TNDOT. Real Estate Management also is responsible for managing data and documents association with more than 1,600 state-owned properties, including data pertaining to transactions involving the site acquisition and disposal as well as documents such as deeds, surveys, titles, and drawings (Table 4). In 1993, Real Estate Management implemented an automated information system with Transaction Tracking and a Land Information System.

Table 4: Tennessee 2001 State Lands Breakdown

Agency	Acres
Agriculture (including Forestry)	161,326
Conservation (including Parks)	174,020
Wildlife Management	294,546
Other	48,208

¹⁵³ Tennessee Base Mapping Program Website: <http://gis.state.tn.us>

¹⁵⁴ The Office of Real Estate Management website is <http://www.state.tn.us/finance/cpm/land.html>.

8) Tennessee Valley Authority (TVA)

The Tennessee Valley Authority (TVA)¹⁵⁵ is a unique federal corporation that is the nation's largest producer of electricity. The TVA also manages the Tennessee River system and serves as an economic development agency within the region. The Geographic Information & Engineering Department of the TVA collects, archives, and disseminates GIS data. The TVA also maintains an Automated Land Information System (ALIS) to manage the 11,000 miles of shoreline and TVA land around the lakes of the Tennessee River system.

9) Tennessee Department of Transportation (TDOT)

The Tennessee Department of Transportation (TDOT) maintains an integrated transportation network. The Inventory Section is responsible for roadway information for highways, roads and streets. This information is collected in the Tennessee Roadway Information Management System (TNRIMS). According to Warnecke (2001), over 28,000 miles of highway centerline data are linked to the TDOT Linear Reference System.

The Mapping Section,¹⁵⁶ which adopted GIS in the early 1990s, is responsible for the creation and maintenance of digital and hardcopy maps. The Mapping Section is responsible for maintaining the GIS spatial network for the TNRIMS database, which is accomplished by linking the GPS collected roadway centerline data with the information found in the TNRIMS database. In addition, the TDOT Aerial Surveys Section is responsible for providing aerial photographic mosaics, photogrammetric digital topographic maps, and photogrammetric digital terrain modeling data for planning, design and earthwork.

10) Tennessee Emergency Communication Board (ECB)

The Emergency Communications Board was established in 1998 to oversee the transition of local governments to an enhanced 9-1-1 service and to coordinate the interoperability of those systems with the promotion of standards. The Emergency Communications Board (ECB) is responsible for street addressing at the state level, but it is not involved in local address assignment or in addressing standards development. Local E911 Centers are responsible for street addressing at the local level. OIR-GIS Services is in the process of formalizing and finalizing a relationship with ECB for the provision of a uniform statewide intelligent street centerline GIS layer.

11) Tennessee Geographic Information Council (TNGIC)

Originally formed in 1994 from an ad-hoc group with an interest in the application of GIS in natural resources, the Tennessee Geographic Information Council (TNGIC)¹⁵⁷ has grown into a grass roots organization of a few hundred professionals, representing local, state and federal governments as well as the private sector. Although TNGIC is not officially recognized within state government, it actively provides information and networking opportunities for GIS professionals and encourages statewide coordination of GIS activities.

¹⁵⁵ TVA GIS profile: <http://gis.state.tn.us/library/InAction/Federal/tva.htm>

¹⁵⁶ TDOT Mapping and Inventory Section website: [http://www.tdot.state.tn.us/Chief_Engineer/assistant_engineer_Planning/planning/mapping_& statistics_office/mapping.htm](http://www.tdot.state.tn.us/Chief_Engineer/assistant_engineer_Planning/planning/mapping_&_statistics_office/mapping.htm)

¹⁵⁷ TNGIC Website: <http://www.tngic.org/>

b. Control Structures

1) Policies

a) Geographic Reference Framework

Tennessee does not have a Public Land Survey System (PLSS), rather metes and bounds are employed to describe parcels of land.¹⁵⁸ At present, there are no statutes that require individual boundary surveys to be tied to the HARN. The Tennessee Base Mapping Program ortho-imagery and data products, however, are tied to the HARN.

The Tennessee Department of Transportation (TDOT) maintains the Tennessee High Accuracy Reference Framework (HARN), which provides data for a more accurate adjustment to the National Spatial Reference System (NSRS). The 1990 Tennessee HARN was established using the early Macrometer equipment, but, because it contained large observational errors, most of the HARN was re-adjusted and re-published in 1995 (GPS904).¹⁵⁹

b) Parcel Specific Information

In 1963, the Comptroller of the Treasury manually mapped parcel data for all 95 counties using a common index scheme. As a result, Tennessee has a statewide base map in a common coordinate system upon which to build their current efforts. Today, the Comptroller of the Treasury maintains parcel maps for 80 of the 95 counties as well as property assessment attribute data for 90 of the 95 counties. Thus, maps and attribute data for the majority of parcels within the state are centrally located and readily available in an identical format.¹⁶⁰

Through the state's Computer Assisted Appraisal System (CAAS), the Department of Property Assessments (DPA) and the Office of Management Services provide data processing services to local governments for property tax administration. Implementation of CAAS III was completed in 1991, almost thirty years after the first system was established. CAAS combines appraisal data with the Name, Address and Legal Description System (NAL) into a single system. CAAS IV is under development. A web-based CAAS query application was implemented in FY2000-2001 so that other state agencies as well as Assessors' Offices could access the system on-line. Efforts to expand CAAS functionality are underway with the implementation of CAAS IV. This new system will combine the attribute data from CAAS with the parcel-level digital map data developed through the GIS Base Mapping Program, which is described below.

¹⁵⁸ "A method of describing a parcel of land by citing the owners of abutting lands and describing the length of each course of a boundary as "along" some apparent line, such as, along the "stream" or "along the road." In modern usage, a metes and bounds description includes the bearings and distances of each course." Glossaries of BLM Surveying and Mapping Terms

¹⁵⁹ http://www.profsurv.com/ps_scripts/article.idc?id=127

¹⁶⁰ Statewide GIS Base Mapping Program Business Plan. 1998. Tennessee Office of Information Resources, July 17, 1998. http://gis.state.tn.us/Library/Business_Plan/business_plan.pdf

The Comptroller's Office, in partnership with the Department of Finance and Administration, initiated a pilot program in 1996 to develop technical specifications for a statewide parcel-mapping program. Two counties were selected. This pilot program produced digital orthophotography, planimetric data, and digital parcel data. This initial effort launched the Tennessee Geographic Information (GIS) Base Mapping Program.

c) Tennessee Geographic Information System (GIS) Base Mapping Program (BMP)

The Tennessee GIS Base Mapping Program is a five-year effort to develop a uniform statewide digital base map consisting of high-resolution digital ortho-imagery and a digital parcel layer, the specifications of which meet the needs of both county and municipal governments as well as those of state agencies.¹⁶¹ The digital ortho-imagery will be available with a 4' ground resolution for all rural areas in the state and with a 0.5' ground resolution for urban areas. In addition to the ortho-imagery, several other products will be produced, including digital terrain models (DTMs), street centerline data, hydrography and drainage data, and limited land cover data. New aerial photography will be acquired on a 1-5 year cycle, depending on need and on the amount of new development occurring within each county.

The manually produced parcel maps maintained by the State are being digitized and overlaid the ortho-imagery as part of the Base Mapping Program. Importantly, the resulting digital parcel maps will be linked dynamically to the Comptroller's Computer Aided Assessment System (CAAS) database, providing complete access to the CAAS database in a geographic environment. The project is slated for completion in 2008.

The Comptroller's Office is designated as the "proactive" custodian of the parcel data layer and, as such, is responsible for insuring that the parcel data is maintained, either internally, or by each county's Property Assessor Office. Counties will not be required to perform digital parcel maintenance to participate in the program. Rather, they may opt to purchase digital products that permit "read only" access to view and query digital parcel data.¹⁶² Those counties that choose to maintain their parcel maps at the local level will be required to supply a copy of their digital parcel data annually to the Comptroller's Office. The Comptroller's Office, in turn, will monitor the accuracy and completeness of these data sets to ensure standardization. If for any reason the county parcel data fails to comply with state requirements, the Comptroller's Office may assume county parcel maintenance and charge the county Assessor's Office accordingly.¹⁶³

The Comptroller's Office also is responsible for parcel data distribution. It is tasked with providing a system by which county Assessor Offices and Division of Property Assessment field office may access digital parcel data

¹⁶¹ For technical specifications, refer to the report "Tennessee Base Mapping Program Technical Specifications" (OIR and Comptroller of the Treasury 2001).

¹⁶² Division of Property Assessments, Comptroller of the Treasury 2002 Annual Report, p. 42.
<http://www.comptroller.state.tn.us/pa/2002annrept.pdf>

¹⁶³ Statewide GIS Base Mapping Program Business Plan. 1998. Office of Information Services, July 17, 1998. p. 9.

through a “live” connection. Access to and distribution from this system, however, would be restricted to authorized personnel. A second “static” system will be developed to distribute parcel information and data to state agencies and other potential customers.

d) State of Tennessee Spatial Data Architecture

The purpose of the Spatial Data Architecture (SDA)¹⁶⁴ is to establish the roles and responsibilities, to establish and implement strategic and tactical planning processes, to identify critical issues, and to provide a framework for the utilization of data products generated by the GIS Base Mapping Program. The SDA is organized around six principles relating to strategic planning, shared infrastructure, personnel, data sharing, data distribution, and program development.

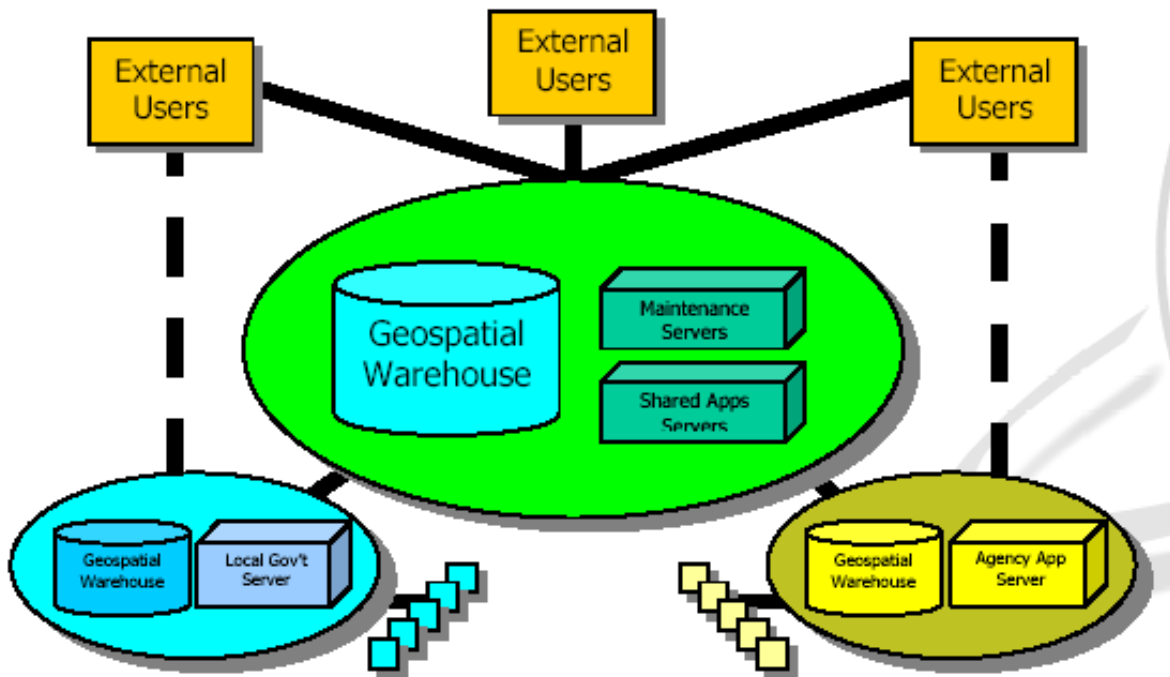
The Principles of the SDA are as follows:

- “Spatial data, like other information resources maintained by the State, is a valuable resource and must be easily shared among agencies;
- The State and state agencies will develop and implement comprehensive GIS strategies through continuous geospatial systems planning;
- Hardware and software infrastructure for data storage and application development will be economical, scalable, and responsive;
- A GIS personnel classification system is critical to the success of GIS in State government;
- A comprehensive GIS strategy will generate additional opportunities for interfacing programs between and among local, state, and federal government;
- Distribution and access policy for spatial data will be coordinated and consistent across the enterprise of State government.”

The SDA advocates implementing the Base Mapping Program data in a geospatial data warehouse. Figure 6 depicts a high level architecture of the geospatial data infrastructure of the SDA. As stated in the SDA (2002, p. 7), the central oval represents the infrastructure to support the access and maintenance of the Base Mapping Program data, whereas the two bottom ovals represent existing agency infrastructures and/or local government partners. The small boxes attached to the agency ovals represent end users of geospatial applications. The External Users boxes at the top of the diagram might include citizens, local governments, academic institutions, or the private sector.

¹⁶⁴ Spatial Data Architecture for the State of Tennessee. 2002. Office of Information Services GIS Services Division, January 18, 2002. p. 1 <http://gis.state.tn.us/projects/sda/index.htm>

Figure 6: Tennessee Spatial Data Architecture



2) Legal Framework

Assessors of property in rural counties are required by T.C.A. 68-5-806b to file a copy of their maps in the Office of the Register of Deeds by October 1 of each year in any of the following forms: hardcopies, microfilm or compact disc. The recorded maps, which are certified to the Division of Property Assessments (DPA) by October 15, must reflect the status of ownership as of January 1. The DPA, in turn, must provide to the State Board of Equalization a summary of county compliance by November 15.

The Division of Property Assessments' (DPA) responsibilities are enumerated in T.C.A. § 67-1-202. The statewide mapping and reappraisal programs conducted from 1967 through 1977 were mandated by T.C.A. § 67-1718, although this section was subsequently deleted. Chapter 495, Public Acts of 1989 establishes a plan for systematic reappraisal of locally assessed real property. The DPA is mandated:

- "to ensure the administration of property tax programs in all taxing jurisdictions pursuant to T.C.A. § 67-1-201 through § 67-1-514, 1 through 10, T.C.A. § 67-5-101 through § 67-5-1703";
- "to ensure a standardized record-keeping system for all property tax records through the continued use of the division's computerized appraisal and tax billing system";
- "to ensure an up-to-date and equitable property tax base in all taxing jurisdictions through continuing county reappraisal efforts and the maintenance of the division's Computer Assisted Appraisal System, pursuant to T.C.A. § 67-5-1601 through § 67-5-1603";

- “to ensure county property ownership maps are accurate and current so assessing officials can correctly locate property boundaries and related information and to ensure counties comply with T.C.A. § 67-5-806(b), which requires maps to be filed annually in the office of the register of deeds”;
- “to accomplish appraisal ration studies in every county pursuant to T.C.A. § 67-5-1604 through § 67-5-1606”; and
- “to monitor on-site review and valuation of properties, provide valuation assistance, develop valuation indexes and audit assessor performance in accordance with T.C.A. § 67-5-1601 (d) (1).”¹⁶⁵

Created by Executive Order in October 1983, the Information System Council (ISC) oversees all state information technology matters under Acts 1923, ch. 3, § 1; Shan. Supp., § 226a1; Code 1932, § 167; T.C.A. (orig. ed.), § 3-201. The Office of Information Resources (OIR) of the Department of Finance and Administration provides staff support to the Information Systems Council. In addition, the OIR facilitates the use of information systems, provides technical direction and assistance for all distributive processing and network related systems within state government, and serves as a computer service bureau under Acts 1994, ch. 992, § 4, T.C.A. § 4-3-5503; Acts 2002, ch. 880, § 4, T.C.A. § 71-5-192. There is no enabling legislation or administrative code that addresses the GIS Base Mapping Program or the OIR-GIS Services Division specifically.

3) Funding and Costs

The Tennessee GIS Base Mapping Program is estimated to cost \$54 million dollars for the entire state (Table 5: Estimated Costs for the Tennessee Base Mapping Program). It is expected that \$20 million will come from the Federal government, between \$3.5 and \$4.5 million from the private sector, between \$7.5 and \$8.5 from local government, and \$21-\$23 million from the State of Tennessee.

Initially, the anticipated mix of funding for the Base Mapping Program was 25% per county from county and local government partnerships and 75% from a combination of state, Federal, private sector, and public and private utility funding sources. In reality, many areas within the state have economies that cannot support this level of investment. Only 35-40% of the counties in Tennessee can meet the goal of 25% local participation, which represents a mere 12-15% of local government share. Thus, the Business Plan explored a variety of cost recovery options and estimated that 8% of local participation costs could be recovered through data licensing and sales.

The Tennessee General Assembly committed \$5 million for the Base Mapping Program for FY1999-2000, supporting the acquisition of data in 12 counties, and authorized another \$5 million in FY2000-2001.

Based on research of industry cost/benefit studies conducted for several county and municipal GIS implementation programs and based on a 10-12 year life cycle of the data sets being produced, the Business Plan estimated that the State of Tennessee can expect a benefit/cost ratio of at least 2:1 from the Base Mapping Program.

¹⁶⁵ 2002 Annual Report of the Division of Property Assessments, p. 3.

Table 5: Estimated Costs for the Tennessee GIS Base Mapping Program¹⁶⁶**Imagery and Planimetric Products:**

	Number of Sheets	Aerial Photography	Ortho Imagery Planimetrics	Total
100 Scale	25,692	\$5,747,010	\$18,395,472	\$24,142,482
400 Scale	11,810	\$2,332,475	\$8,367,516	\$10,699,991
			Subtotal	\$34,842,473

Parcel Data Products

	2,605,318	Total Parcels at	\$5.50 Ea.	\$14,329,249
			Subtotal	\$49,171,722
		Project Management (@10% of Product Cost)		\$4,917,172
		Grand Total		\$54,088,894

Notes:

1. These figures represent production costs for the entire State. No adjustments have been made for completed counties, work in progress or any other existing data sets.
2. All recommendations for changes to the specifications discussed above have been accounted for in the figures above.
3. Typically, Parcel data are priced on a per parcel basis as opposed to sheet by sheet. All costs associated with conversion of the parcel data are included in the figures shown.

4) Standards

The State adopted Environmental Systems Research Institute (ESRI) Arc/Info as the GIS software standard in 1992 by resolution of the Information Systems Council. Other hardware and software standards include Sun for Unix-based servers, Windows NT/2000 for Intel-based servers, and Oracle for database software.

Guidelines for the Base Mapping Program are described in detail in the document "Tennessee Base Mapping Program Technical Specifications," which was prepared by the Office of Information Resources and Comptroller of the Treasury and released on April 30, 2001.

The Emergency Communications Board (ECB) provides a set of guidelines for street addressing, but these are not strictly enforced at the local level.

c. Issues and Opportunities

The Base Mapping Program (BMP) has been very successful. The fact that the State covered 75% of the cost of the base mapping for each county proved to be a tremendous incentive for local participation and for local compliance with data standards. To date, the BMP has enlisted the participation of nearly 30 Assessors' Offices. While local Assessors' have long acknowledged the benefits of GIS, they now have the opportunity to implement it within their own offices and, in so doing, to modify their workflows so as to improve efficiency and service.

¹⁶⁶ Business Plan. 1998. p. 11.

One significant impediment, however, is the “digital divide.” Approximately 50% of Assessors’ Offices in Tennessee do not have an Internet connection in their office, and frequently, Assessors’ Office personnel have never used a computer. While an Assessor’s Office may house a terminal and while the necessary infrastructure may be in place, assessors do not always see the benefit of and hence seek out network connectivity for day-to-day operations.

Within state government, many departments and agencies have implemented GIS programs independently of each other and hence have limited ability to share data between agencies. The digital base map produced by the Base Mapping Program will provide a common, seamless framework and hence will facilitate GIS data sharing amongst state agencies as well as local governments.

Perhaps the biggest impediment is the economy in general. One perception is that there is not enough funding. In at least two communities, the county commissioners and county staff are technically savvy. They realize the benefits of GIS; but, in order for them to implement the Base Mapping Program and to cover the cost of a minimal hardware configuration, they would have to increase their property tax mill rate by 2 to 3 points. In some counties, the \$60,000 – 85,000 total cost would translate into a 100% to 200% increase in their property tax rates. In many communities, there is just not enough of a tax base to support any technological implementation.

Two important elements that have contributed to the success of the Base Mapping Program are: 1) the Business Plan, developed in 1998; and 2) the Spatial Data Architecture. Both the Business Plan, which includes cost models and analysis, and the Spatial Data Architecture, which presents an overview of the technological infrastructure, provide direction for the program and have been instrumental in eliciting the legislature’s support.¹⁶⁷

Over time, the OIR-GIS Services Division hopes to make the transition to ESRI’s Geodatabase Model for the BMP. In addition, GIS Services is considering acquiring 2’ resolution satellite imagery of the state.

One area of opportunity is federal involvement at the local level, such as Homeland Security and the National Spatial Data Infrastructure (NSDI). Initially, state and local governments hoped that 9-11 would spur the Federal government to work more closely with local governments on GIS data development, but there is still a great deal of uncertainty on the part of the Federal government on to how to proceed.

Another possible area of opportunity is recent comprehensive planning legislation. The 100th Tennessee General Assembly called for the establishment of Growth Plans, Planned Growth Areas, Rural Areas, and Urban Growth Boundaries. This legislation intends to provide uniform, compact and contiguous development of local communities and to establish consistent public service. But, while mapping is urged as part of this legislation, no real guidance has been provided to local governments on how to proceed.

¹⁶⁷ While OIR-GIS Services has continued to update and refine the Business Plan in practice, it has not been officially revised so as to provide a stable document that legislators can reference.

6. Virginia

Geographic Information Systems (GIS) technology took root in Virginia in the early 1980s. Several state agencies and programs applied GIS to environmental problems. Contemporaneously, a grass roots organization called the Virginia Applied Land Information Systems (VA LIST) Group coalesced, representing federal, state, and local governments, as well as academic institutions and the private sector. In 1995, VA LIST proposed the establishment of a “state coordinator for mapping, surveying, and land information systems (LIS).” This proposal resulted in a feasibility study, as authorized by Senate Joint Resolution 80, and, subsequently, in the establishment of a Division of Mapping, Surveying and LIS and of an Advisory Commission on Mapping, Surveying and LIS in 1988. Unfortunately, this Division was eliminated two years later. The Advisory Commission’s existence was reaffirmed by the General Assembly in 1992, but it too was abolished in 1996. In the ensuing vacuum, the Council on Information Management (CIM) assumed de facto responsibility for statewide GIS coordination efforts.

In 1994, the General Assembly authorized and funded the Virginia Geographic Information Network (VGIN) Division to coordinate statewide GIS activities and placed it within the Department of Planning and Budget (DPB), but this too was short lived. Conflicts over the direction of the program led to the abolishment of VGIN one year later. Once again, CIM stepped in to provide direction and coordination.

The General Assembly authorized another study to evaluate the need for statewide GIS coordination, which resulted in the reauthorization of the VGIN Division in 1997 as well as the establishment of the VGIN Advisory Board [Virginia Code Sec. 2.1-563.37]. This time, however, VGIN was placed within the CIM. Three cabinet secretariats under the Governor, including Transportation, Commerce and Trade, and Natural Resources, provided initial funding (roughly \$250,000 for the first two years), although this was not authorized until the 1998 legislative session. A year later, CIM, renamed the Department of Technology Planning (DTP), was placed under the direction of the newly created Secretary of Technology, along with VGIN, the Department of Information Technology (DIT) and the Center for Innovative Technology (Warnecke 2000).

Today, over 91 % of Virginia’s counties and independent cities have adopted and actively use GIS technology.

a. Administrative Structures/Coordination Structures and Procedures

In Virginia, land information is collected and maintained locally by a variety of offices, including the Clerk of Circuit Court, Commissioner of the Revenue, Real Estate Assessments (if such a department exists), the Treasurer, the Voting Registrar, the Information Technology and/or GIS Department(s), the Building and Zoning Department(s), the Health Department as well as the local E-911 Office, Emergency Services, and Sheriff. However, nearly all other departments deal with land records information at some level.

At the county level, real estate title registration is a function of the Clerk of Circuit Court. While there is no statewide parcel database as of yet, an increasing number of municipal and county governments are creating digital databases that incorporate

legacy information. Real tax records, on the other hand, are generally maintained by the Commissioner of Revenue, or in some cases the Department of Real Estate Assessment. GIS and CAMA database integration is beginning to take root within these local offices. GIS services are often provided through the Clerk of Circuit Court, through the Commissioner or Assessor's Office, or through the County Administrator (county executive). In some instances, GIS is housed within its own department or as part of an Information Technology Department. Of all the counties in the state, however, only Wise County has a GIS and real estate conveyance document database linkage.¹⁶⁸

Unfortunately, because a state parcel mapping standard is not in place, local governments vary in how they map parcels. For example, some counties use unique parcel numbers, which are assigned by the Commissioner of Revenue, while others use geo-codes at longitude and latitude.¹⁶⁹ These differences will be a major logistical hurdle in the development of a statewide parcel database. Moreover, "stovepipe" operations pervade local government. No one office is either officially or unofficially coordinating overall land records modernization efforts within county governments.

In regards to permitting and development, the Building Department handles construction permits, while local planning commissions or Zoning Departments are responsible for maps and planned development. In smaller communities, the functions of these entities often are combined under the umbrella of a single Building and Zoning Department. The use of land use features for land management functions is growing among Virginia localities. Lastly, the Health Department manages conditional sewer permits.

Virginia has several organizations that guide statewide land records modernization efforts, including: 1) the Virginia Geographic Information Network (VGIN) Division; and 2) the VGIN Advisory Board; 3) the State Compensation Board; and 4) the Wireless E-911 Services Board.

Statewide professional organizations such as the Virginia Association of Mapping and Land Information Systems (VAMLIS), the Virginia Real Estate Appraisers Board,¹⁷⁰ the Virginia Commissioners of Revenue Association,¹⁷¹ the Virginia Association of Planning District Commissions (VAPDC),¹⁷² the Virginia Association of Surveyors (VAS),¹⁷³ the Pontiac Chapter of ASPRS, and the VGIN State and Local Work Group Network also provide guidance, education and training.

Major state and federal land owners and administrators, and hence key custodians for parcel information, include the Virginia Department of Transportation (VDOT), the Virginia Department of Conservation and Recreation, the Department of General Services Real Estate Group, and the Virginia Department of Mines, Minerals and

¹⁶⁸ Of note, many counties, including Fairfax, Loudoun, Prince William, Scott, King William, Warren and Wise, along with the cities of Virginia Beach and Martinsville, are making their land records available over the Internet. Many others are moving in this direction.

¹⁶⁹ Geocode based parcel IDs will be somewhat redundant for full GIS implementation.

¹⁷⁰ VA Real Estate Appraisers Board website: http://www.state.va.us/dpor/apr_main.htm

¹⁷¹ VA Commissioners of Revenue Association website: <http://www.vacomrev.com>

¹⁷² Virginia Association of Planning District Commissions website: <http://www.institute.virginia.edu/vapdc/>

¹⁷³ Virginia Association of Surveyors, Inc. website: <http://www.vasurveyors.com>

Energy. VDOT is the state's largest land owner and information depository. The Virginia Department of Mines, Minerals and Energy maintains extensive land data on coal extraction, gas and oil wells, and other minerals. All of these agencies have county field offices. In addition, the National Forest Service and Park Service have a significant presence. But, there is no coordinated effort to manage these records at this time.

1) Clerk of the Circuit Court/County Clerk/Clerk of Court

The Clerk of Circuit Court is a state constitutional officer as set forth in the constitution of Virginia (Article VII, Sec. 4). Under § 15.2-1634 (1997, c. 587), voters in every county and in each city that has a circuit court elect a clerk of circuit court for an eight year term of office. The Code of Virginia enumerates over 800 separate responsibilities for the Clerk; thus, the Circuit Court Clerks perform the duties that in many states are divided among three or more separate offices. Essentially, the duties of the clerk of the circuit court fall into two categories: 1) those associated with judicial proceedings in the circuit court; and 2) those associated with general record keeping for the county, including recording all documents relating to land transfers, deeds, deeds of trust, mortgages, births, deaths, wills, and divorces as well as recording election results and issuing hunting, fishing, and marriage licenses [Virginia Code § 17.1-200 through 17.1-291; § 55-106 through 55-142.9].

2) Commissioner of the Revenue (COR)

The Commissioner of the Revenue is a state constitutional officer as set forth in the constitution of Virginia (Article VII, Sec. 4) and is the chief tax assessing office of local government. Under § 15.2-1636 (1997, c. 587) every county and city elects a commissioner of the revenue, or assessor, for a four year term of office. The Commissioner of the Revenue is responsible for administering the assessments for businesses and individuals in the areas of Real Estate Taxes, Personal Property Taxes, Business License Fees, Consumer Utility Taxes, Machinery and Tools and Special Taxes on Meals and Lodging. This office also provides assistance in the preparation of Virginia State Income Tax returns. [Virginia Code § 58.1-3100 through 58.1-3177; § 58.1-3200 through 58.1-3389]

3) Real Estate Assessments

The Department of Real Estate Assessments, if one exists within a county, is responsible for: the annual appraisal of all real property; the notification of assessments; and for the maintenance of current ownership records and description of real estate parcels (land and improvements). This department shall assess all real estate within a county on an annual or biennial basis as authorized by Virginia Code § 58.1-3270, and transfer such assessment to the Commissioner of the Revenue within the county.

4) Planning District Commissions (PDC) and the Virginia Association of Planning District Commissions (VAPDC)

In 1968, Virginia was divided into 21 planning districts. A Planning District Commission¹⁷⁴ (PDC) is a political subdivision chartered under the Regional Cooperation Act by local governments of each planning district. Commissions are comprised of elected officials and citizens appointed to the commission by member local governments. The purpose of Planning District Commissions, as mandated by the Code of Virginia, §15.2-4207, is "to encourage and facilitate local

¹⁷⁴ VAPDC website: <http://www.institute.virginia.edu/vapdc/>

government cooperation and state-local cooperation in addressing on a regional basis problems of greater than local significance. The cooperation resulting from this chapter is intended to facilitate the recognition and analysis of regional opportunities and to take account of regional influences in planning and implementing public policies and services.” Virginia’s PCD offer a variety of technical and program services to member governments, including grant application assistance management services for program implementation, land use planning services and mapping. In fact, PDCs often lead local governments in the use of GIS. Importantly, each PDC serves as an Affiliate State Data Center for the region.

The duties of the PDCs are enumerated below:

- “To conduct studies on issues and problems of regional significance;
- To identify and study potential opportunities for local cost savings and staffing efficiencies through coordinated local government efforts;
- To identify mechanisms for the coordination of state and local interests on a regional basis;
- To implement services upon request of member localities;
- To provide technical assistance to state government and member localities;
- To serve as a liaison between localities and state agencies as requested;
- To review local government aid applications as required by applicable law;
- To conduct strategic planning for the region as required by applicable law;
- To develop regional functional area plans as deemed necessary by the commission or as requested by member localities
- To assist state agencies, as requested, in the development of substate plans;
- *To participate in a statewide geographic information system, the Virginia Geographic Information Network, as directed by the Department of Planning and Budget; and*
- *To collect and maintain demographic, economic, and other data, acting as a state data center affiliate in cooperation with the Virginia Employment Commission.”¹⁷⁵*
(emphasis added)

The Virginia Association of Planning District Commissions assists member PDCs in meeting their responsibilities to local and state government and, in addition, coordinates inter-PDC functions.

5) Virginia Geographic Information Network (VGIN) Division

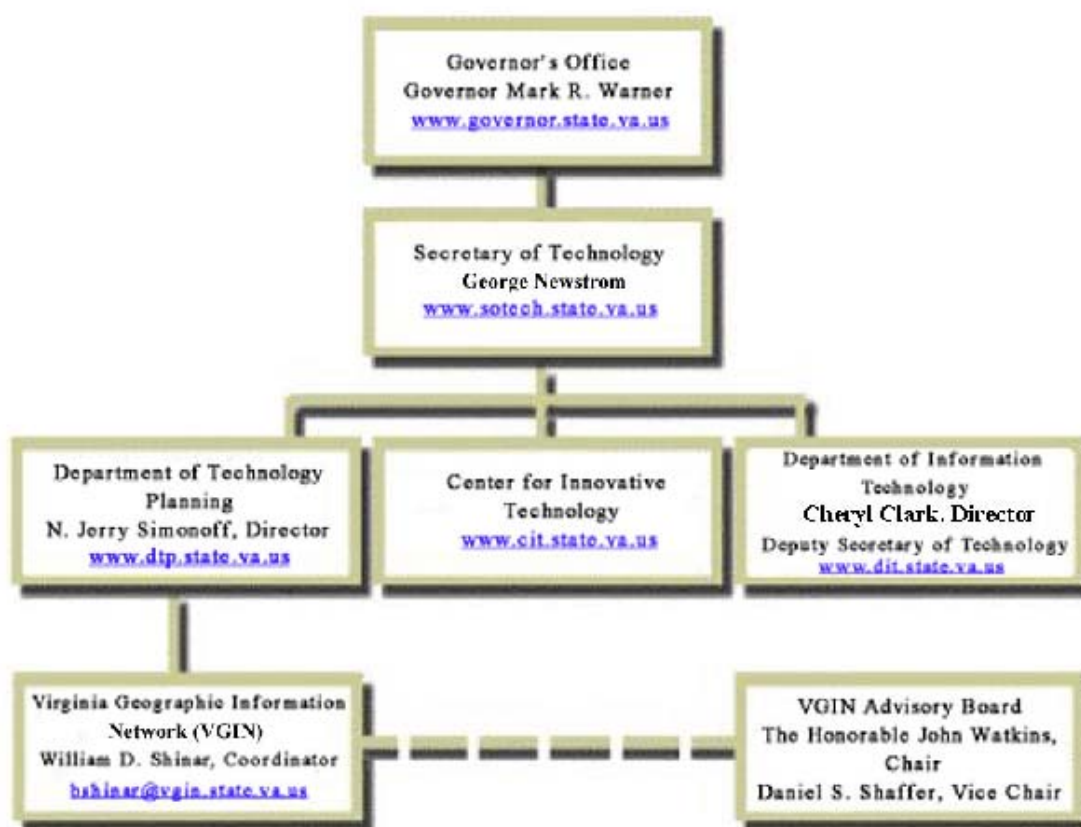
Established by legislative mandate in 1997, the Virginia Geographic Information Network (VGIN) is the lead public agency for coordination of statewide GIS activities in Virginia. VGIN is located within the Department of Technology Planning (DTP), which is tasked with developing statewide technology plans, policies, standards, and guidelines and with providing support to the Secretary of Technology, who acts as Virginia’s Chief Information Officers (CIO). The Office of the Secretary of Technology (Figure 7) is comprised of four agencies, including: the

¹⁷⁵ What is a PDC Webpage: <http://www.institute.virginia.edu/vapdc/Whatis.html>

Department of Technology Planning, the Department of Information Technology (DIT), the Virginia Information Providers Network (VIPNet), and Virginia's Center for Innovative Technology (CIT) [Virginia Code § 2.2-225; §2.2-2020 through 2.2-2025].

This organizational structure, however, will be changing as per statute H1926.¹⁷⁶ Beginning on or before January 1, 2004, certain IT activities and assess will be consolidated into the Virginia Information Technologies Agency (VITA). This new agency will replace the Department of Information Technology and the Department of Technology planning, which are to be abolished. VGIN will remain under the Secretary of Technology.

Figure 7: Virginia Secretary of Technology Organizational Chart¹⁷⁷



VGIN's mission is "to facilitate the cost-effective development and use of spatial data, GIS, and related technologies in organizations throughout the Commonwealth."¹⁷⁸ To this end, VGIN, in cooperation with the Wireless E-911 Services Board, the VGIN Advisory Board, state agencies and local government, coordinated the Virginia Base Mapping Program (VBMP). This effort resulted in

¹⁷⁶ H1926 <http://leg1.state.va.us/cgi-bin/legp504.exe?031+ful+HB1926ER>

¹⁷⁷ About VGIN website: http://www.vgin.state.va.us/about_organization.html

¹⁷⁸ Virginia Geographic Information Network (VGIN) website: <http://www.vgin.stat.va.us/>

the acquisition of high resolution digital orthophotography (1:48000 rural and 1:2400 urban) for the entire state, which is available free of charge to local governments within the state. VGIN also maintains the Virginia Metadata Clearinghouse and conducts a variety of other projects.

6) Virginia Geographic Information Network (VGIN) Advisory Board

The VGIN Advisory Board, which meets quarterly, advises the VGIN Division (and the soon to be created Virginia Information Technology Agency) on issues related to the exercise of the Division's powers and duties. The Board is comprised of seventeen appointed members and the Director of the Virginia Geographic Information Network Division. The Governor appoints eleven of the Board members, including:

- Four state agencies representatives – the Commonwealth Transportation Commissioner, the Executive Director of the Economic Development Partnership Authority, a director from one of the natural resources agencies, and one state university official;
- One elected official from local government;
- One member of the Virginia Association of Surveyors;
- One elected official who serves on a planning district commission;
- Two representatives of utilities or transportation industries; and
- Two representatives of the private sector with expertise and experience in GIS.

The remaining five members of the Board are drawn from the General Assembly, three members of the House of Delegates, who are appointed by the Speaker of the House of Delegates, and two members of the Senate, who are appointed by the Senate Committee on Privileges and Elections. The CIM director serves as an ex officio, voting member [Virginia Code § 2.2-2433].

7) State and Local Work Group Network

The State and Local Work Group Network provides forums for governments and organizations to identify and develop relevant spatial data priorities, policies and standards within the context of specific areas of interest.

8) Virginia State Compensation Board

The Virginia Conservation Board's mission is "to determine a reasonable budget for the participation of the Commonwealth toward the total cost of office operations for Constitutional Officers, and to assist those officers with automation, training and other means, to improve efficiencies and to enhance the level of services provided to the citizens of Virginia."¹⁷⁹ Under Virginia Code § 15.2-1636.5, the Compensation Board consists of the Auditor of Public Accounts and the State Tax Commissioner, as ex officio members, as well as one member, who may or may not be an officer or employee of the Commonwealth, who shall be appointed and designated as chairman of the Board by the Governor and who shall hold office at the pleasure of the Governor [Virginia Code 1950, § 14-60; 1964, c. 386, §

¹⁷⁹ Virginia Compensation Board website: <http://www.scb.state.va.us/index.htm>

14.1-48; 1983, c. 382; 1998, c. 872.]. The State Compensation Board administers the Information Technology Trust Fund, which is distributed to clerks of court for the development of IT systems.

9) Virginia Department of Transportation (VDOT)

The Virginia Department of Transportation (VDOT) is responsible for maintaining geodetic control and is in the process of considering relevant standards. In addition, VDOT, in partnership with the Virginia Geographic Information Network, intends to provide a statewide street centerline file based on the digital orthophotography, acquired through the Virginia Base Mapping Program, by the end of 2003 or beginning of 2004. Address ranges will be added with the assistance of Emergency Services. To the extent possible, local road files will be conflated or edited to the orthophotography. Roughly one-third to one-half of all counties has geocoded roads with attribution.

10) Wireless E-911 Services Board

Established in 2001, the Public Safety Communications Division¹⁸⁰, within the Department of Technology Planning, administers the Wireless E-911 Services Fund, under the direction of the Wireless E-911 Services Board. This Board is mandated: 1) to “promote and assist in the statewide development, deployment, and maintenance of enhanced wireless emergency telecommunications services and technologies;” and “to promote and assist in the development and deployment of enhanced wireline emergency telecommunications services and technologies only in specific local jurisdictions that are not currently wireline E-911 capable” [Virginia Code §56-484.12 through 56.484.15]. Last year, \$40 million was distributed to local communities for the implementation of wireless E-911.

The Board consists of 14 members as follows: the Chief Information Officer, who serves as chairman of the Board; the Comptroller, who serves as the treasurer of the Board; and the following 12 members to be appointed by the Governor: one member representing the Virginia Department of Emergency Management, one member representing the Virginia State Police, one member representing a local exchange carrier providing E-911 service in Virginia, two members representing wireless service providers authorized to do business in Virginia, two county, city or town PSAP directors or managers, one Virginia sheriff, one chief of police, one fire chief, one emergency medical services manager, and one finance officer of a county, city, or town.

VGIN and the VDOT are mandated to provide technical assistance to the Wireless E-911 Services Board. In addition, the Wireless E-911 Services Board is providing substantial funding for the Virginia Base Mapping Program. At the present time, however, little linkage exists between 911 addressing and GIS, although this is rapidly changing for some counties (e.g., Wise County’s GIS database links to 911/zip+4/parcel IDs).

¹⁸⁰ Public Safety Communications Division website: <http://www.911.state.va.us/>

11) Virginia Association of Mapping and Land Information Systems (VAMLIS)

Founded in 1989, the Virginia Association of Mapping and Land Information Systems (VAMLIS)¹⁸¹ is a non-profit organization that gathers together over 400 individuals and organizations from a variety of disciplines, including cartography, geographic information systems, surveying, engineering, geography, photogrammetry, and land records management. VAMLIS promotes educational, communication and legislative programs to advance mapping and geographic information systems within the Commonwealth of Virginia.

b. Control Structures

1) Policies

a) Parcel Specific Information

As constitutional officers, circuit court clerks, who are responsible for the administration of land records, have some flexibility in crafting automation and policy decisions for their offices. In result, users of land records must contend with a multitude of procedures for indexing and varying levels of automation. Recognizing that this “patchwork” impeded public access to Virginia’s land records, the General Assembly directed the Joint Legislative Audit and Review Commission (JLARC), under Senate Joint Resolution 338 (1995), to assess the need and feasibility of land records modernization. The General Assembly also instructed JLARC to explore whether these land records could be incorporated into a statewide land or geographic information system (LIS/GIS).

The JLARC report, entitled “*The Feasibility of Modernizing Land Records in Virginia*,”¹⁸² cited as major impediments the lack of standards for indexing formats, land records content, and records management automation and the limited funding approach to modernization efforts. JLARC suggested that land record content standards might include: (1) using “a unique parcel identification number and/or reference to the State plane coordinate system, (2) using metes and bounds descriptions, (3) updating legal property descriptions in deeds through surveys, (4) including a plat or reference to a previously recorded plat in all recorded deeds, and (5) marking property corners with personalized monuments on a statewide basis.”

JLARC also noted one fundamental problem with the structure of the Information Technology Trust Fund. The trust fund (§ 14.1-125.2), which consists of revenues obtained from an additional \$3 dollar recordation and filing fee collected by each circuit court clerk, was intended to assist clerks’ offices with acquiring office and information technology, with preserving and maintaining court records, and with improving public access to court records. In addition, trust funds were designated to study the design of a statewide system of remote access to clerks’ land records. However, as JLARC commented in their report,

¹⁸¹ Virginia Association of Mapping and Land Information Systems website: <http://www.vamlis.org>

¹⁸² JLARC Report: <http://jlarc.state.va.us/summary/rpt198/land.htm>

“[t]he development of an allocation policy for the trust fund has been marked by difficulties in making important decisions concerning how money will be allocated from the trust fund and ultimately spent by the circuit court clerks. The specific types of expenditures that may be made with trust fund money, and the criteria and methodology that will be used by the Compensation Board to make funding decisions, have not yet been determined ... Due to differing interpretation of the trust fund’s statutory provisions, a potential conflict may be developing between the Compensation Board and some of the circuit court clerks regarding the types of expenditures that may be made using trust fund money. There has also been some disagreement over the legislative intent of the trust fund, primarily between the circuit court clerks and the real estate industry. The appropriate definition of technology, the potential application of the State’s fiscal stress factor to allocations, and the amount of discretion the clerks should have in making expenditures have contributed to these disagreements.”

The JLARC, therefore, strongly urged the General Assembly to restructure the trust fund so as to clarify legislative intent and to create a task force on land records management to make recommendations in support of a broad-based land records modernization initiative in Virginia.

Based on JLARC’s recommendations, the 1997 General Assembly passed House Bill 2579 and thereby established the Land Records Management Task Force (LRMTF)¹⁸³ under the Director of the Council on Information Management to address these issues. The Task Force published a strategic plan for modernizing land records in their Interim Report¹⁸⁴ to the Governor and Chairmen of the House Appropriates and Senate Finance Committees on September 1, 1997. The Task Force defined land records management as “the uniform indexing and preservation of the instruments and data relating to land integrated with local and state geographic information system (GIS) layered data, assessment information, and other public records relating to the land and made available to the public.”

The Task Force’s final report, published January 1, 1998, presented a comprehensive assessment of the status of land records automation across the state and offered guidelines and specifications for land records modernization within clerks’ offices. The report included: 1) an inventory of automated land-records technology in circuit court clerks’ offices; 2) a set of recommendations regarding format, content and technology standards for land records; 3) a proposal for the development of a Land Records Architecture; 3) a comprehensive plan for future land records automation in clerks’ offices; 4) a set of recommended policies to guide the Compensation Board in allocating the Technology Trust Fund; and 6) a set of recommendations regarding user fees charged for access to land records.¹⁸⁵

The LRMTF proposed seven goals for the development of automation plans by individual Clerks’ offices. These included:

¹⁸³ Land Records Modernization Task Force website: <http://www.dtp.state.va.us/LRMTF/index.htm>

¹⁸⁴ LRMTF Interim Report <http://www.dtp.state.va.us/LRMTF/docs/intreport.doc>

¹⁸⁵ LRMTF Final Report http://www.dtp.state.va.us/LRMTF/docs/lrmtf_final_report.pdf

- “Participation in the statewide electronic gateway process;
- Automated land records indexing system;
- Onsite and remote access to automated land records indexing system;
- Automated land record instruments imaging system;
- Onsite and remote access to automated land record instruments imaging system;
- Ensure land records maintained in an electronic format by local government entities are available and accessible as determined by the local government in accordance with state law; and
- Provide capabilities for submitting land record instruments for recording electronically.”

In addition, the LRMTF adopted four principal goals:

- “Uniform standardized indexing and automation procedures that support statewide electronic remote access to those land record indexes maintained by Clerks of Court;
- Enhanced electronic remote access to land records maintained by Circuit Court Clerks and the departments of local government;
- Forge consensus between the Circuit Court Clerks and the users of their land records information (lawyers, surveyors, Realtors (trademarked name), bankers, title abstractors, journalists, local government organizations and the general public) to ensure automation efforts in the Circuit Court Clerk offices that are mutually; and
- Uniform content and format of land records that promotes their usefulness in integrated local government information systems, eliminates duplication of information, and promotes data sharing and electronic access.”¹⁸⁶

Using the guidelines provided by the LRMTF, each Circuit Court Clerk produced an individual automation plan and implementation schedule by January 1999. But, according to a survey conducted in 2001, while all 120 circuit courts maintain at least one website, only 25 clerks’ offices provided land records via the Internet.

The Task Force spent a significant amount of time developing a set of Indexing Standards; but, these standards were never adopted by the General Assembly so that their use is not statutorily required on a statewide basis. Unique parcel identification numbering (PIN) systems, as proposed by the Task Force, have not become a statewide standard. Current statutory language requires any jurisdiction that has a parcel identification numbering system in place to display the PIN or tax identification number on the first page of any land record submitted and allows indexing by that number, but development of PIN system is not required (Code of Virginia § 17-79.3). As of

¹⁸⁶ 2002 Land Records Management Progress Report, Compensation Board, December 1, 2001, p. 3.
<http://www.scb.state.va.us/landrecords/02LandRecordsMgmt.pdf>

2002, 71 clerks' offices reported requiring the use of parcel identification number son all land records.

The Task Force also developed a Land Records Cover Sheet to reduce the amount of time required to index documents and to improve accuracy. The Cover Sheet agent, which provides a template for entering such information as the PIN, grantor/grantee, consideration, latitude/longitude, and a brief description, is first prepared by the public and then scanned into the indexing system by the clerk. Unfortunately, without legislation requiring its use, the Cover sheet has not gained widespread acceptance; in fact, only nine clerk's offices operationally used it in 2002.¹⁸⁷ The Cover Sheet, however, has become the de facto indexing "standard" for those counties who use it.

Currently, there is no statewide depository of parcel specific maps and information. However, the Virginia Base Mapping Program will provide a free and consistent statewide base map to support the development of local databases. VGIN anticipates that the VBMP will provide a catalyst to support the development and maintenance of parcel data across the state.

Efforts also focus on providing online access to land records via a subscription service with 3-4 levels of access: 1) limited access to marriage records, but not to images, targeted at genealogists; 2) full access for government agencies; and 3) corporate access.

b) Virginia Base Mapping Program (VBMP)¹⁸⁸

Based on a study conducted in 2000, VGIN predicted that over \$200 million dollars would be spent every few years on the development and maintenance of GIS technology and spatial data by state agencies, utilities, regional planning commissions, universities, and county and municipal governments, in addition to federal agencies that operate within the state of Virginia. This study also demonstrated that local governments were creating a myriad "of geographic information systems built upon diverse map bases, with varying accuracy, scales, and orientation and dates." In VGIN's assessment, this "patchwork quilt" had the potential to negatively impact the "many local, regional, and state business applications that require multi-jurisdictional or regional data....Therefore, in order to promote the effective and economically efficient development and sharing of spatial resources across the Commonwealth, and to realize the highest and best use relative to cost, the Commonwealth of Virginia sought to establish a consistent foundation or base map resource upon which local government spatial data, applications, and GIS could be consistently developed and maintained."

¹⁸⁷ 2002 Land Records Management Progress Report, Compensation Board, December 1, 2001, p. 6

<http://www.scb.state.va.us/landrecords/02LandRecordsMgmt.pdf>

According to the Progress report, "Many clerks feel that their customers will not be as conscientious about the detailed information required on the cover sheet, which may result in errors. Also many officers feel that some less computer-savvy customers will not accept the cover sheet or may require ongoing training and assistance, increasing staff time in the record room. In those offices that have implemented the use of the cover sheet, the most advantageous method has been to set a specific date on which all records must be submitted with the cover sheet, allowing several months in which the cover sheet software is distributed to all regular customers and additional copies are made available at the counter or via a website link (p. 6)."

¹⁸⁸ VBMP Overview: <http://www.vgin.state.va.us/VBMP/1118-VBMP-Overview.doc>

Unfortunately, initial attempts to fund a statewide base mapping effort as part of the 2000-2002 biennial budget cycle was unsuccessful. But, because a consistent, statewide, high quality, high-resolution base map is necessary to accurately pinpoint cellular callers, the Public Safety Commission Board agreed to subsidize the Virginia Base Mapping Program (VBMP) as part of their Phase II Wireless E-911 implementation efforts.

The VBMP began in earnest at the beginning of 2002. As of March 31, 2003, every county and municipal government in Virginia will receive a set of full color, leaf-off, digital orthophotography, developed at one of 3 scales:

- 1:4,800 scale (2' resolution) in rural areas;
- 1:2,400 scale (1' resolution) in urban and suburban areas; and
- 1:1,200 scale (1/2' resolution) in areas where localities could afford to purchase the higher accuracy product.

They also will receive a Digital Terrain Model (DTM) and ancillary data as part of this package. While this product will be provided free of charge to all government and public sector organizations in Virginia, a licensing agreement will restrict redistribution of this data.¹⁸⁹

2) Legal Framework

a) Virginia Information Technologies Agency (VITA) and the Information Technology Investment Board

The Bill H1926, approved on March 3, 2005, establishes the Information Technology Investment Board and the Virginia Information Technologies Agency (VITA). The Board is mandated to oversee VITA in the planning, budgeting, acquiring, managing, and disposing of major information technology projects in the State. In addition, the Board is directed to hire a Chief Information Officer (CIO) to oversee the day-to-day operations of VITA. In so doing, this bill also abolishes the Department of Information Technology, the Department of Technology Planning and the Virginia Information Providers Network Authority, while at the same time establishes the Division of Project Management within the VITA. The bill provides for the consolidation of the procurement and operational functions of information technology for state agencies. VGIN will be affected by the legislation.

b) VGIN Division and Division Coordinator

The authority and duties of the VGIN Division and the Division Coordinator are among the strongest in the nation for statewide GIS coordination (Warnecke 2000). The VGIN Division and Division Coordinator are authorized under §2.1-563.38 of the Code of Virginia. Mandates of the Division are:

- “Requesting the services, expertise, supplies, and facilities of the Council from the Director on issues concerning the Division;
- Accepting grants from the US Government and agencies and instrumentalities thereof and any other source. To those ends the

¹⁸⁹ VBMP News: <http://www.vgin.state.va.us/news/digortho.html>

Division shall have the power to comply with such conditions and execute such agreements as may be necessary or desirable;

- Fixing, altering, charging and collecting rates rentals, and other charges, for the use or sale of products of, or services rendered by, the Division,, at rates which reflect the fair market value;
- Soliciting, receiving and considering proposals for funding projects or initiatives from any state or federal agency, local or regional government, institutions of higher education, non-profit organization or private person or organization;
- Soliciting and accepting funds, goods, and in-kind services, that are part of any accepted project proposal;
- Establishing ad hoc committees or project teams to investigate related technologies or technical issues and providing results and recommendations for Division action;
- Establishing such bureaus, sections, or units as the Division deems appropriate to carry out its powers and duties.”

The VGIN Division Coordinator is also authorized under §2.1-563.38 of the Code of Virginia. Mandates of the Coordinator are:

- “Oversee the development of and recommend to the Council the promulgation of those policies and guidelines required to support state and local government exchange, acquisition, storage, use sharing, and distribution of geographic or base map data and related technologies;
- Foster the development of a coordinated comprehensive system for providing ready access to electronic state government geographic data products for individuals, businesses, and other entities;
- Initiate and manage projects or conduct procurement activities relating to the development or acquisition of geographic data and/or statewide base map data;
- Plan for and coordinate the development or procurement of priority geographic base map data. Initiate and manage products or conduct procurement activities relating to the development or acquisition of geographic data and/or statewide basemap data;
- Develop maintain and provide in the most cost effective manner access to the catalogue of Virginia geographic data and governmental data users;
- Provide upon request advice and guidance on all agreements and contracts form all branches of state government for geographic data acquisition and design and the installation and maintenance of geographic information systems;
- Compile a data catalogue consisting of descriptions of GIS coverages maintained by individual state and local government agencies. All state agencies that maintain GIS databases shall report to the Division the details of the data that they develop, acquire, and maintain;

- Identify and collect information and technical requirements to assist the Division in setting priorities for the development of State digital geographic data and base maps that meet the needs of state agencies, institutions of higher education, and local governments;
- Provide services, geographic data products, and access to the repository at rates established by the Division; and
- Ensure the compliance of those policies standards and guidelines adopted by the Council required to support and govern security of state and local government exchange, acquisition, storage, use sharing, and distribution of geographic or base map data and related technologies."

The Virginia General Assembly strengthened the VGIN's authority through the 1999 budget bill when it required that "all state and non-state agencies receiving an appropriation in Sec. 1-1 through 1-135 of this act shall comply" with "guidelines, standards, and operating policies and procedures for effective management of GIS in the Commonwealth" as adopted by the Secretary of Technology (Warnecke 2001, 187).

c) Uniform GIS for a Locality

Virginia Code § 15.2-962 provides authority to require a unified geographic information system for a locality. "Any locality may by ordinance require that any or all of its agencies, departments, authorities, committees, instrumentalities, or political subdivisions participate in one or more unified or centralized systems for geographic information, mapping, surveying, or land information. The ordinance may establish such conditions as may be necessary to develop, maintain, and operate any such system for geographic information, mapping, surveying, or land information [1992, c. 39, § 15.1-11.7; 1997, c. 587]."

d) Virginia Coordinate System

Virginia Code § 55-287 through § 55-297.2 designates a Virginia coordinate system as "[t]he systems of plane coordinates which have been established by the National Ocean Survey/National Geodetic Survey or its successors for defining and stating the positions or locations of points on the surface of the earth within the Commonwealth of Virginia are hereafter to be known and designated as the "Virginia Coordinate System of 1927" and the "Virginia Coordinate System of 1983" [1946, p. 166; Michie Suppl. 1946, § 2849(1); 1984, c. 726].

e) Virginia Information Technology Trust Fund Fee

Chapter 637, § 17.1-279 of the Code of Virginia, as amended and reenacted on April 6, 2002, permits an additional fee to be assessed by circuit court clerks for information technology. It states:

"A. In addition to the fees otherwise authorized by this chapter, the clerk of each circuit court shall assess a three-dollar fee, known as the "Technology Trust Fund Fee," in each law and chancery action, upon each instrument to be recorded in the deed books, and upon each judgment to be docketed in the judgment lien docket book. Such fee shall be deposited by the State Treasurer into a trust fund. The State Treasurer shall maintain a record of such deposits.

B. Two dollars of every three-dollar fee shall be allocated by the Compensation Board from the trust fund for the purposes of: (i) obtaining office automation and information technology equipment, including software and conversion services; (ii) preserving, maintaining and enhancing court records, including, but not limited to, the costs of repairs, maintenance, service contracts and system upgrades which may include, but not necessarily be limited to, a digital imaging system; and (iii) improving public access to court records. The Compensation Board in consultation with the circuit court clerks and other users of court records shall develop policies governing the allocation of funds for these purposes. In allocating funds, the Compensation Board may consider the current automation of the clerks' offices and the recommendations made in the 1996 report by the Joint Legislative Audit and Review Commission (JLARC) regarding automation of the circuit court clerks' offices. Except for improvements as provided in subsection E, such policies shall require a clerk to submit to the Compensation Board a written certification from the Department of Technology Planning that the clerk's proposed technology improvements will be compatible with a system to provide statewide remote access to land records in accordance with the recommendations of JLARC and the Task Force on Land Records Management (the Task Force) established by the Department of Technology Planning. The remaining one dollar of each such fee may be allocated by the Compensation Board from the trust fund for the purposes of (i) funding studies to develop and update individual land-records automation plans for individual circuit court clerks' offices and (ii) implementing the plan to modernize land records in individual circuit court clerk's offices and provide remote access to land records throughout the Commonwealth.

D. Such fee shall not be assessed to any instrument to be recorded in the deed books nor any judgment to be docketed in the judgment lien docket books tendered by any federal, state or local government.

E. Notwithstanding any other provisions of this chapter, each circuit court clerk may apply to the Compensation Board for an allocation from the Technology Trust Fund for automation and technology improvements for any one or more of the following: (i) equipment and services to convert paper, microfilm, or similar documents to a digital image format, (ii) the conversion of information into a format which will accommodate remote access, and (iii) the law and chancery division of his office. However, allocations for (iii) above shall not exceed the pro rata share of the collections of the three-dollar fee relative to the chancery and law actions filed in the jurisdiction as provided in this section."

f) State Highway Plat Book

Virginia Code § 17.1-238 mandates a state highway plat book to be kept locally within each Clerk's Office. "A loose-leaf book known as "state highway plat book," which shall be provided by the Department of Transportation, shall be installed in the circuit court clerk's office of each county of this Commonwealth and in the clerk's office of the circuit court of any city wherein the Department of Transportation has acquired any interest in land, and all highway plats pertaining to the primary and secondary highway systems, and all plats in connection therewith, shall be filed therein by the clerk. The clerk shall note on each recorded deed relating to such plats and on the margin of the page of the deed book, wherein such deed is

recorded, the numbers of the state highway plat book and page wherein such plats are filed. The clerk so filing the plats and so noting the same shall receive a fee of five dollars. All plats filed prior to July 1, 1950, in such state highway plat book be and the same are hereby validated [1950, p. 477, § 17-69.1; 1956, c. 19; 1994, c. 432; 1998, c. 872]."

g) Recent Legislation for Clerk of Court's Records

Remote access to and sensitivity of personal information contained within land records have "hot button" issues in Virginia over the last year.

H2426¹⁹⁰, adopted on February 27, 2003, restricts the kind of information that can be included on documents court clerks post on the Internet. Those wishing to access court records online must now register with each court to establish their identity.

This bill "provides that beginning January 1, 2004, no court clerk shall post on a court-controlled website any document that contains the following information: (i) an actual signature; (ii) a social security number; (iii) a date of birth identified with a particular person; (iv) the maiden name of a person's parent so as to be identified with a particular person; (v) any financial account number or numbers; or (vi) the name and age of any minor child. The bill also provides an exception for court clerks providing remote access to their records if their network or system that is used to provide the access has been is certified by the Department of Technology Planning. It also requires the Department to establish security standards that must be followed by court clerks providing remote access to records in consultation with circuit court clerks, the Supreme Court, the Compensation Board, users of land and other court records, and other interested citizens. The bill has a July 1, 2005 sunset provision." The following statutes will be revised as a result.¹⁹¹

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+17.1-225>

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+17.1-226>

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+17.1-252>

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+17.1-255>

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+17.1-256>

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+17.1-276>

Of note, language requiring Internet users to specify a purpose for requesting online access to certain public records that was tacked on to HB2426 by Senator Bill Bolling, but was later struck down by Governor Warner on April 2, 2003.¹⁹²

¹⁹⁰ HB 2426 <http://leg1.state.va.us/cgi-bin/legp504.exe?031+bil+HB2426>

¹⁹¹ Recent discussion in the news regarding this legislation can be found at <http://www.fredericksburg.com/News/FLS/2003/022003/02132003/879405>.

¹⁹² <http://www.opengovva.org>

HB 2294¹⁹³, adopted February 25, 2003, requires “remote access to land records to be by paid subscription service through circuit court clerk’s office or designated application service providers.”

HB 1845,¹⁹⁴ passed March 3, 2003, “expands the provisions for recording documents electronically to anyone who has entered into such an agreement with the court clerk. The bill makes technical changes to refer to the Uniform Electronic Transactions Act and the Rules of the Supreme Court of Virginia regarding electronic filing and electronic signatures. The bill makes permanent these provisions by repealing the sunset.”

HJ 631¹⁹⁵, passed on February 22, 2003, “continues the joint subcommittee studying the protection of court records. The joint subcommittee shall review the findings and recommendations of the Executive Summary of the Supreme Court concerning information in court records and recommend necessary changes in the statutory law.”

SB 714,¹⁹⁶ adopted March 3, 2003, “allows the clerk to refuse to file any instrument that includes a grantor’s, grantee’s or trustee’s social security number.” In hindsight, the Land Management Task Force would have recommended the redaction of social security numbers on real estate documents; they are not needed in general.

h) Pending Legislation concerning VGIN

Senate Bill 610 designates that VGIN coordinate gathering data on health on health issues related to biotechnology threats and on how to respond to them, if funding for this is authorized. In addition, a budget amendment submitted by Senator Watkins would give VGIN the option to market VBMP data to private vendors and public entities outside of the Commonwealth of Virginia.

i) Pending Legislation concerning Land Surveyors

House Bill 1129 includes language that would require that “photogrammetry” work be conducted by licensed surveyors. This bill has been carried forward into next year’s legislative session.

3) Funding and Costs

Circuit court clerks assess a \$3-dollar fee on all documents recorded since July 1, 1996 called the “Technology Trust Fund Fee (TTF).” Two dollars of every three dollars collected are retained by the clerk’s office for the acquisition and development of information technology, while the remaining one dollar is funneled into the Rapid Innovation Fund (RIF) program. Clerk’s can apply for additional funding under the RIF program once all \$2 funds are expended or committed. Under the RIF program, 68 clerks’ offices have received \$2.8 million dollars for automation efforts. While collections of the TTF fee have remained a steady source of income, expenditures have grown exponentially. Budget requests

¹⁹³ HB 2294 <http://leg1.state.va.us/cgi-bin/legp504.exe?031+bil+HB2294>

¹⁹⁴ HB 1845 <http://leg1.state.va.us/cgi-bin/legp504.exe?031+bil+HB1845>

¹⁹⁵ HJ 631 <http://leg1.state.va.us/cgi-bin/legp504.exe?031+bil+HJ631>, see also HB 2305 <http://leg1.state.va.us/cgi-bin/legp504.exe?031+bil+HB2305>

¹⁹⁶ SB 714 <http://leg1.state.va.us/cgi-bin/legp504.exe?031+bil+SB714>

in 2001 totaled \$9.4 million dollars.¹⁹⁷ Unfortunately, with current state of the economy, the General Assembly is tapping into the Rapid Innovation Fund to meet other, unrelated needs.

The VGIN Division is supported through general fund with an annual budget of approximately half a million dollars.¹⁹⁸ Early efforts to fund the Virginia Base Mapping Program were unsuccessful. Governor Gilmore proposed spending approximately \$3 million in his 2000-2002 biennial budget on first year expenditures of the Virginia High Resolution Base Map Initiative. Unfortunately, the General Assembly did not share his enthusiasm. The following year, General Assembly Senator John Watkins added the Virginia Base Mapping Initiative as a \$5 million dollar budget amendment for FY 2002. This too failed.

But, proponents of VBMP were persistent. Because a consistent, statewide, high quality, high-resolution map base was needed to locate cellular callers, the Virginia Public Safety Communications Division and the Wireless E-911 Services Board considered VGIN's request to use Wireless E-911 funds for the Virginia Base Mapping Program. Ultimately, VGIN was able to demonstrate the significant cost savings of a coordinated statewide effort. Indeed, the overall estimated cost of providing statewide ortho-imagery, approximately \$12 million dollars (over four years), was between \$3 and 5 million dollars less than the overall estimated cost of developing digital orthophotography on an independent county-by-county basis. Thus, on October 10, 2001, the Public Safety Communications Board voted to fund the Virginia Base Mapping Program.

4) Standards

VGIN sponsors state and local government stakeholder work groups to review existing federal (FGDC) standards (e.g., for cadastral and planimetric data) and, where necessary, to recommend Virginia standards. But, Virginia does not have a parcel mapping standard at this point in time.

As described above, the Land Records Modernization Task Force proposed standards for land records content and format and standards for statewide indexing.¹⁹⁹ As of yet, however, these standards are not statutorily mandated and local compliance is spotty.

Model Virginia Map Accuracy Standards,²⁰⁰ effective March 20, 1992, are applicable to all state agencies and institutions of higher education that are engaged in such functions as planning, managing, developing, purchasing and using information technology resources in Virginia. This standard is advisory to local governments and other interested parties. The purpose of the standard is to provide a model approach for defining spatial accuracy as it pertains to maps of all scales greater than or equal to 1:100,000 prepared for special purposes or

¹⁹⁷ 2002 Land Records Modernization Progress Report, Compensation Board, November 1, 2001, p.1.

¹⁹⁸ Currently, only two of the four staff positions are filled.

¹⁹⁹ <http://www.dtp.state.va.us/LRMTE/index.htm>

²⁰⁰ http://www.dtp.state.va.us/pubs/Guidelines/g92_1.pdf

engineering applications in state agencies. Similarly, Virginia adopted a Spatial Data Transfer Standard in 1994.²⁰¹

The Virginia Base Mapping Program contains technical specifications for the acquisition and delivery of statewide digital ortho-imagery and associated products. A critical part of the base mapping process will be the development of standards and guidelines to support local efforts to consistently develop value added data products, such as parcel maps, hydrography, and road centerlines.

c. Issues and Opportunities

In some respects, statewide land records modernization efforts have not been as successful as was hoped. Virginia still lacks state level oversight of local land records modernization. Issues that have hindered progress in the past are: 1) the lack of a state incentive for local GIS creation with statewide minimum standards; the Technology Trust Fund is underutilized for this purpose; 2) the lack of state agency directives to provide agency-relevant GIS data to local governments; 3) the lack of standards and common software requirements; and 4) the lack of trained local level GIS coordinators that also serve as liaisons with state agencies.

While VGIN has made in roads, particularly at the state level, a general resistance to data sharing persists. At present, there is no incentive for local or state data sharing beyond Freedom of Information Act requests, although a few communities have champions who coordinate modernization efforts within local government. Privacy concerns and 9/11 have only exacerbated general resistance at the local level. Furthermore, a server to host statewide data is not yet in place. The VGIN Metadata Project for local resources has been greatly hindered by a lack of funding.

That said, by establishing a consistent, statewide digital framework through the Base Mapping Program, Virginia hope's to accomplish five strategic goals:

- "Establish one consistent, cost-effective spatial data foundation to support the development of uniform and cost-effective applications, products, and services, Commonwealth-wide;
- Produce a powerful impetus for local governments to adopt consistent guidelines and standards;
- Provide the opportunity to establish a streamlined, uniform, Commonwealth wide spatial information network, which will allow for the efficient sharing and exchange of information, applications, and Best Management Practices (BMPs);
- Produce significant saving among all information users, state, regional, and local, public and private, by maximizing opportunities to increase productivity and minimize cost; and,
- Improve access to and use of the Commonwealth's spatial data resources by the public and the private sector."²⁰²

²⁰¹ http://www.dtp.state.va.us/pubs/standards/s94_1.pdf

²⁰² <http://www.vgin.state.va.us/news/digortho.html>

By consolidating and coordinating base mapping efforts at the state level, Virginia saved several million dollars when compared to the expense that would have been incurred if the orthophotography had been acquired on a county-by-county basis. Now, with digital orthophotos in hand, each community will have an accurate base map upon which to build spatial data and applications.

Opportunities for leveraging the Base Mapping data are numerous. For example, some counties, like Wise County, are considering the possibility of participating in the FEMA Cooperating Technical Partners program.

Another exciting area of opportunity is the collaborative efforts of seven natural resource agencies and organizations. In 2000, VGIN organized the Virginia Natural Resource Managers Work Group to identify common spatial data needs and priorities and to leverage and combine individual efforts into focused investments. The Work Group identified 62 operational GIS applications supported by 90 GIS data layers, which are documented in the report *Natural Resources GIS Application and Data Analysis*.²⁰³ VGIN is currently conducting a user needs assessment for these agencies and organizations, which will be completed at the end of 2003. VGIN is also administrating and coordinating meetings of the Demographic Economic Cultural and Infrastructure Work Group as well as ten local user groups.

²⁰³ http://www.vgin.state.va.us/documents/Nat_Res_Final.pdf

7. Wisconsin

The State of Wisconsin is one of the more progressive states in the nation for the implementation of modern, local land information systems (LIS). Today, all of Wisconsin's 72 counties are actively pursuing land records modernization. By 2003, it is expected that 80% of all property records will be modernized in the state.²⁰⁴ This is not surprising, however, given Wisconsin's push over the last three decades to improve information systems for land records management.

Beginning in the late-1960s, researchers at the University of Wisconsin-Madison partnered with the USDA Economic Research Service (ERS) to pursue research on land title data and land title recording systems. In 1975, the Wisconsin Department of Administration (DOA) Planning Department inventoried land records data collection and use by state agencies.²⁰⁵ Following this inquiry, the DOA and the University of Wisconsin-Madison initiated a study to determine what factors impeded access and use of land data and records and to assess statewide spending on the non-automated collection and management of land data and records.²⁰⁶ This research culminated in 1978 with a landmark report entitled *Land Records – the Cost to the Citizen to Maintain the Present Land Information Base, a Case Study of Wisconsin*. First, the study found that Wisconsin taxpayers spent over \$78 million annually on land data and records collection and management. Second, local governments shouldered 52% of these costs.²⁰⁷ These considerable expenditures countered any skepticism about the need for land records automation.

UW-Madison faculty conducted a series of local government pilot projects that focused on the development and implementation of the multipurpose land information system (MPLIS) concept. By the early-1980s, the UW had sponsored numerous workshops, seminars and programs that attracted land information experts from around the world. In 1984, a seminar series organized to address "the technical and institutional issues associated with the creation of modern land information systems" drew over a thousand people from all levels of government, in addition to private industry, and sparked the formation of a statewide land information coalition, known as the Ad Hoc Consortium for Land Records Modernization.²⁰⁸ As a result of this *ad hoc* coalition's lobbying, Governor Anthony Earl established the Wisconsin Land Records Committee (WLRC) by Executive Order No. 79 in 1985.

The WLRC, a 32-member committee with broad geographic and professional diversity, was assigned the task of examining the needs of state and local agencies regarding land

²⁰⁴ Koch, T. W., D. Hart, D.D. Moyer, and B. J. Niemann. 2001. *Land Records Modernization Activity in Wisconsin: Impacts, Status and Future Tasks 1990-2000. A Report for the Wisconsin Land Information Board and the Strategic Assessment Task Force*. January 2001. Madison, WI: Wisconsin Land Information Board.

²⁰⁵ Krauskopf, T.M., K.S. Butler, B.E. Goldin, J.H. Haugen. 1975. *Inventory of Wisconsin Land Resources Data*. Madison, WI: State Planning Office, Wisconsin Department of Administration.

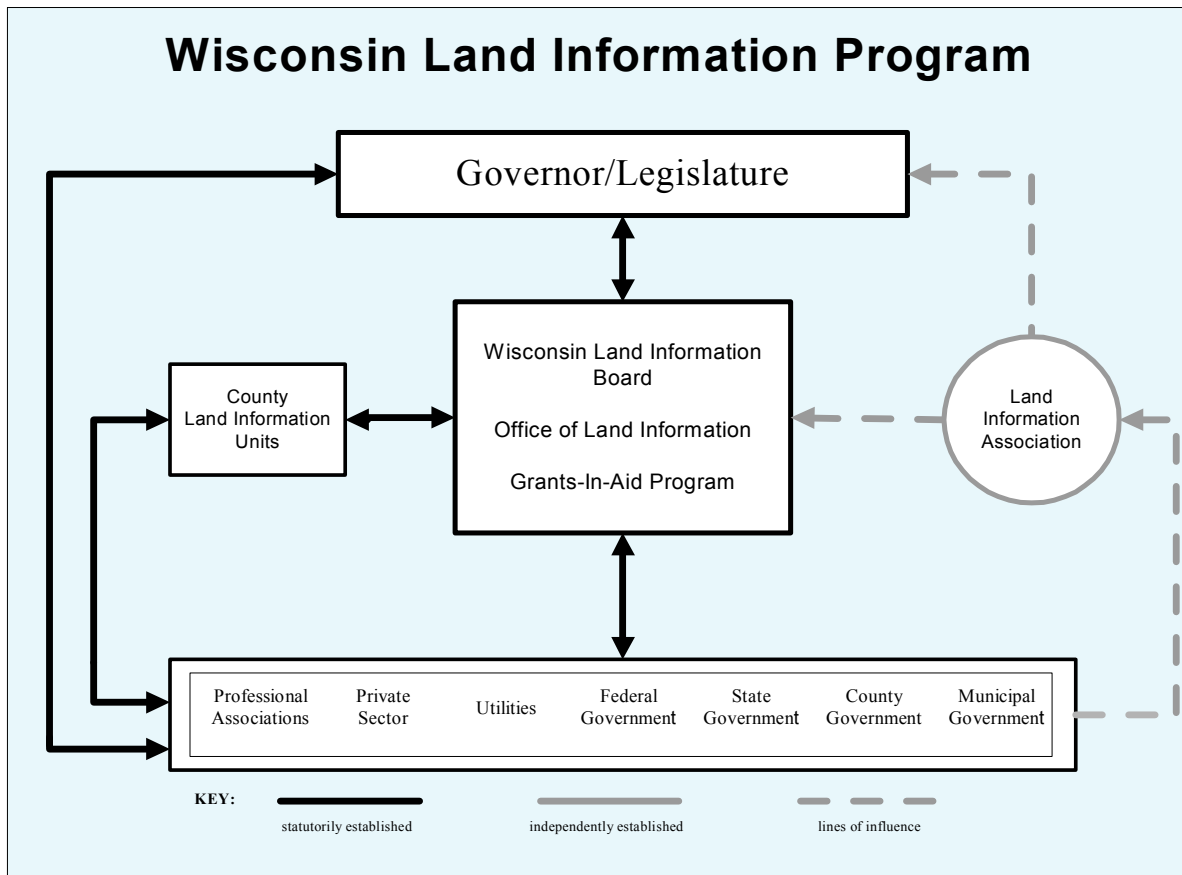
²⁰⁶ Moyer, D.D. and B.J. Niemann Jr. 1998. *Land Information Systems: Development of Multipurpose Parcel-based Systems in The History of Geographic Information Systems: Perspectives from the Pioneers*. T.W. Foresman (Ed.) (Upper Saddle River, New Jersey: Prentice Hall PTR), pp. 85-118.

²⁰⁷ Larsen, B.J., J.P. Clapp, A.H. Miller, B.J. Niemann Jr., and A.L. Ziegler. 1978. *Land Records: The Cost to the Citizen to Maintain the Present Land Information Base: A Case Study of Wisconsin*. Madison, Wisconsin: Wisconsin Department of Administration.

²⁰⁸ Moyer and Neimann (1998); see also Warnecke (2000).

information collection and of developing a set of recommendations for statewide land records modernization. After two years of investigation, the WLRC presented their conceptual model for the Wisconsin Land Information Program (WLIP) in a final report. This report contained five recommendations: 1) establish a Wisconsin Land Information Board (WLIB) to set policy and to provide direction; 2) establish an Office of Land Information to administer the program; 3) establish a grants-in-aid program to fund the development of local and regional land information systems and to provide technical assistance; 4) provide incentives for each county to designate a County Land Information Officer (LIO) as a specified point of contact between the state and the county; and 5) encourage the establishment of a non-profit land information association.²⁰⁹

Figure 8: WLRC Conceptual Model²¹⁰



Participants in both the Ad Hoc Consortium for Land Records Modernization and the WLRC formed the Wisconsin Land Information Association (WLIA) in 1987, thus realizing the fifth recommendation.

²⁰⁹ Clapp, J., D.D. Moyer, B.J. Niemann, Jr., C. Reinhard, and B. Weisman. 1987. *Final Report of the Wisconsin Land Records Committee: Modernizing Wisconsin's Land Records*. Madison, WI: Institute for Environmental Studies, University of Wisconsin-Madison, 53. See also Moyer and Neimann (1998), p. 113.

²¹⁰ Wisconsin Land Council and Wisconsin Land Information Board. 2002. *Report to the Governor and Legislature: An Evaluation of the Functions, Activities and Future Directions*. September 2002. Madison, WI: WLC and WLIB.

Two years later, the remaining four WLRC recommendations were implemented. The 1989 Wisconsin Legislature established the Wisconsin Land Information Program (WLIP) and the Wisconsin Land Information Board (WLIB), and provided funding for these activities a year later.

a. Administrative Structures/Coordination Structures and Procedures

In Wisconsin, land information is collected and maintained at the local level by a variety of elected and appointed offices, including the Register of Deeds, the Real Property Lister, Treasurer, Assessor, Clerk, County Surveyor, Land Information Officer, Cartographer, Planning and Development, Zoning, and Building Inspection. However, nearly all departments deal with land records information at some level. The Land Information Office is responsible for overall local land information coordination, although this office may be vested in any of the other departments as determined by the County Board.

Wisconsin has several organizations that guide statewide land records modernization efforts, including: 1) the Wisconsin Land Information Board (WLIB), which administers the Wisconsin Land Information Program (WLIP); 2) the Department of Administration's Office of Land Information Services (OLIS), which staffs the WLIB and WLIP through technical assistance, land records modernization plan review, and fund distribution; 3) the County Land Information Officers Network (LION); and 4) the State Cartographer's Office (SCO). In addition, the Wisconsin Land Council (WLC) addresses land use related data and issues. Regional Planning Commissions (RPCs) may serve as regional clearinghouses of local data and frequently act in some capacity as coordinators of land information activities.

Statewide professional organizations such as the Wisconsin Land Information Association (WLIA),²¹¹ the Wisconsin County Surveyors Association (WCSA), the Wisconsin Society of Land Surveyors (WSLS), the Wisconsin Registers of Deeds Association (WRDA),²¹² the Wisconsin Real Property Listers Association (WRPL),²¹³ ESRI Wisconsin User Group (EWUG),²¹⁴ Wisconsin Chapter of Geospatial Information & Technology Association (GITA),²¹⁵ and the Wisconsin Chapter of the American Planning Association (WAPA)²¹⁶ also provide guidance, education and training.

An ad hoc interagency data sharing group was formed in 1986 and continued until the mid-1990s before it was disbanded. A group of state agency GIS managers formed in 2000 and worked to resolve issues of position descriptions and vendor licensing before disbanding. Currently, no place exists for GIS data managers, modelers and developers to meet on a consistent basis.

Major state and federal land owners and administrators, and hence custodians for parcel information, include the Wisconsin Department of Natural Resources (WDNR),

²¹¹ Wisconsin Land Information Association website: <http://www.wlia.org/>

²¹² Wisconsin Register of Deeds Association website: <http://www.wrdaonline.org/>

²¹³ Wisconsin Real Property Listers Association website: <http://www.co.ozaukee.wi.us/wrpla/>

²¹⁴ ESRI Wisconsin User Group website: <http://www.ewug.org>

²¹⁵ GITA Wisconsin Chapter <http://www.gita.org/chapters/wisconsin/wisc.html>

²¹⁶ Wisconsin Chapter of the American Planning Association website: <http://www.wisconsinplanners.org/>

the Wisconsin Board of Commissioners of Public Lands, as well as the U.S. Forest Service.

- The WDNR Bureau of Facilities and Lands, along with WDNR GeoServices Section, are jointly working on a Public Lands Project. The WDNR's procedure for mapping public lands was developed just as the Wisconsin Land Information Program (WLIP) began. In general, however, as county land records modernization efforts progressed, no systematic effort was made to integrate WDNR parcel automation with county land records. As a result, the current WDNR public lands layer does not use county parcel numbers and so cannot be tied to local land records.
- Local assessment rolls are not consistent in how public lands are recorded and, thus, pulling this information out on a statewide basis will be difficult. A digital layer of statewide county-owned lands does not exist.
- Parcels managed by the WDOT have not been systematically automated in a statewide fashion.
- The U.S. Forest Service's forests map was passed to the WDNR, but it is now over half a decade old.

1) Assessor

Under Wisconsin Statutes § 70.23, the duties of the Assessor are as follows:

“(1) The assessor shall enter upon the assessment roll opposite to the name of the person to whom assessed, if any, as before provided in regular order as to lots and blocks, sections and parts of sections, a correct and pertinent description of each parcel of real property in the assessment district and the number of acres in each tract containing more than one acre.

(2) When 2 or more lots or tracts owned by the same person are considered by the assessor to be so improved or occupied with buildings as to be practically incapable of separate valuation, the lots or tracts may be entered as one parcel. Whenever any tract, parcel or lot of land has been surveyed and platted and a plat of the platted ground filed or recorded according to law, the assessor shall designate the several lots and subdivisions of the platted ground as the lots and subdivisions are fixed and designated by the plat. [History: 1971 c. 215; 1983 a. 532; 1993 a. 491; 1997 a. 35, 253; 1999 a. 96.]”

According to a survey conducted in the summer of 2002, 95% of Wisconsin assessors in the towns, villages, and cities are appointed; the remaining 5% are elected. Over 70% use a variety of Computer Assisted Assessment Systems (CAMA), but only 20% use GIS software.²¹⁷

2) Register of Deeds Office (ROD)

In the state of Wisconsin, the Register of Deeds is an elected position at the county level for a two year term of office. Under Wisconsin Statutes § 59.43, each Register of Deeds Office is the official repository of real estate records, realty related personal property and vital records (birth, marriage, and death).

²¹⁷ 2002 Survey of WI Assessors: <http://www.dor.state.wi.us/slf/02apsvy.pdf>

According to a 2001 survey conducted by the Wisconsin Register of Deeds Association,²¹⁸ the majority of counties in Wisconsin have installed document imaging systems. In addition, nearly all counties have a computerized grantor/grantee index, roughly half have a computerized tract index, and some provide Internet access to their records. Also of note, fourteen county register of deeds offices require a parcel identification number (PIN) on all documents pertaining to real estate and four require a parcel identification number on conveyance documents pertaining to real estate.

3) Real Property Lister

The County Real Property Lister is an appointed position. The County Property Listing Office functions independently or as a division of another department, such as the Register of Deeds, the County Surveyor's Office, Planning and Development, Treasurer, or the Land Information Office. The Real Property Lister primarily is responsible for assessment rolls and auxiliary reports for assessors; tax deed preparation; and plat and county map review. In some instances, such as Shawano and Sawyer counties, the Real Property Lister also assigns and maintains address numbers for the 911 Property Address System.

Under Wisconsin Statutes § 70.09 (2), a "county board may delegate any of the following duties to the Property Lister:

(a) To prepare and maintain accurate ownership and description information for all parcels of real property in the county. That information may include the following:

1. Parcel numbers;
2. The owner's name and an accurate legal description as shown on the latest records of the office of the register of deeds
3. The owner's mailing address.
4. The number of acres in the parcel if it contains more than one acre.
5. School district and special purpose district codes.

(b) To provide information on parcels of real property in the county for the use of taxation district assessors, city, village and town clerks and treasurers and county offices and any other persons requiring that information.

(c) To serve as the coordinator between the county and the taxation districts in the county for assessment and taxation purposes.

(d) To provide computer services related to assessment and taxation for the assessors, clerks and treasurers of the taxation districts in the county, including but not limited to data entry for the assessment roll, notice of assessments, summary reports, tax roll and tax bills."

4) County Surveyor

The County Surveyor is an elected position for a two year term of office. In lieu of electing a surveyor in any county, the county board may, by resolution, designate that the duties under [§ 59.45 \(1\)](#) and [59.74 \(2\)](#) be performed by any registered land surveyor employed by the county.

²¹⁸ <http://www.wrdaonline.org/TechnologySurvey.htm>

Under § 59.45(1), the County Surveyor is responsible for the following:

1. "Execute, personally or by a deputy, all surveys that are required by the county or by a court. Surveys for individuals or corporations may be executed at the county surveyor's discretion.
2. Make, personally or by a deputy, a record, in books or on drawings and plats that are kept for that purpose, of all corners that are set and the manner of fixing the corners and of all bearings and the distances of all courses run, of each survey made personally, by deputies or by other land surveyors and arrange or index the record so it is an easy to use reference and file and preserve in the office the original field notes and calculation thereof. Within 60 days after completing any survey, the county surveyor shall make a true and correct copy of the foregoing record, in record books or on reproducible papers to be furnished by the county and kept in files in the office of the county surveyor to be provided by the county. In a county with a population of 500,000 or more where there is no county surveyor, a copy of the record shall also be filed in the office of the regional planning commission which acts in the capacity of county surveyor for the county.
3. Furnish a copy of any record, plat or paper in the office to any person on demand and upon payment to the county of the required fees.
4. Administer to every survey assistant engaged in any survey, before commencing their duties, an oath or affirmation to faithfully and impartially discharge the duties of survey assistant, and the deputies are empowered to administer the same.
5. Perform all other duties that are required by law."

5) Land Information Office (LIO)

Under Wisconsin Statutes § 59.72(3), a "county board may establish a county land information office²¹⁹ or may direct that the functions and duties of the office be performed by an existing department, board, commission, agency, institution, authority, or office. If the board establishes a county land information office, the office shall:

- "(a) Coordinate land information projects within the county, between the county and local governmental units, between the state and local governmental units and among local governmental units, the federal government and the private sector.
- (b) Within 2 years after the land information office is established, develop and receive approval for a countywide plan for land records modernization. The plan shall be submitted for approval to the land information board under s. 16.967 (3) (e).
- (c) Review and recommend projects from local governmental units for grants from the land information board under s. 16.967. "

6) Board of Commissioners of Public Lands

The Wisconsin Board of Commissioners of Public Lands²²⁰ holds almost 80,000 acres of Trust Land, most of which is located in the northern third of the state, as

²¹⁹ List of county land information offices: http://www.doa.state.wi.us/dhir/lio_officers.asp

²²⁰ Board of Commissioners of Public Lands website: <http://bcpl.state.wi.us/home/>

well as mineral rights on approximately 269,000 acres. The mission of the Board of Commissioners of Public Lands and its staff is to:

- "Protect and increase the principals of the agency's four Trust Funds: the Common School Fund, the Normal School Fund, the University Fund and the Agricultural College Fund;
- Protect and manage the Trust Lands asset as a long-term investment;
- Protect, preserve, and provide access to Wisconsin's original land records;
- Effectively deploy agency resources in service to the citizens of Wisconsin; and
- Contribute to the improvement and development of the State's infrastructure and economy through the agency's programs. "

As a major land owner in the state, the Board of Commissioners of Public Lands also maintains the original land records for the State of Wisconsin, including original land patents and certificates, original field surveyors' notebooks compiled by contract surveyors between 1832 and 1865, and the original plat maps drawn from the surveyors' notes. These records are gradually being converted into electronic format and will be available on CD for sale to the public.

7) Bureau of Facilities and Lands, Wisconsin Department of Natural Resources (WDNR)

The Bureau of Facilities and Lands²²¹ is responsible for "administering the management of the Department's operated facilities and operation of the properties to provide a comprehensive range of property management related services to field managers." This bureau houses three divisions: Real Estate, Land Management, and Engineering/Construction Management. The Real Estate Section is responsible for: 1) appraisal preparation and review, negotiations, legal document preparation, land title research, mapping, closing process, and record maintenance; 2) tax proration of new parcels acquired in fee, implementation of the payment in lieu of tax system (PILT), trespass settlement, and installment payments; and 3) leases, easements, agreements, and permits associated with land ownership. The following records are available to the public: 1) scanned copies of original survey maps and surveyors' field books; 2) a modified "landnet", a digital data set representing the PLSS Township, Range, Section, Quarter section, and Quarter-quarter section divisions of the state where all survey lines have been extended across water bodies; and 3) the indexing schema for land records derived from the Landnet.

8) Wisconsin Land Information Board (WLIB)

With 1989 Wisconsin Act 31, the Wisconsin Legislature established the Wisconsin Land Information Board (WLIB), giving it the authority and the responsibility to oversee the Wisconsin Land Information Program (WLIP) and to serve as the state clearinghouse for access to land information. The WLIB is composed of 15 core members, designated by statute and appointed by the governor. Members include representatives from local government, the private sector, other interested groups, and state agency secretaries or their designees.

²²¹ WDNR Bureau of Facilities & Land website:
<http://www.dnr.state.wi.us/org/land/facilities/truetemp.html>

The WLIB is charged with: “serving as the state clearinghouse for access to land information; providing technical assistance and advice to state agencies and local government with land information responsibilities; maintaining and distributing an inventory of available Wisconsin land information and records and land information systems; preparing guidelines to coordinate the modernization of land records and land information systems; reviewing and approving projects for grant applications; approving county land record modernization plans; identifying sources of revenue for WLIP operations and grants; integrating state agency land information to enable it to be used to meet land information data needs;...and, conducting soil surveys and soil mapping activities.”²²²

Over the last thirteen years, the WLIB has met legislative charges that define the state's Land Information Program, including:²²³

Serve as the state clearinghouse for land information and land information systems: This legislative charge is met through a clearinghouse service that provides a searchable database of WLIP data and associated metadata via the Internet (WISCLINC). WISCLINC, which was created in 1995 by the State Cartographer's Office, is a registered node on the National Spatial Data Clearinghouse Network and hopefully will serve as the structural foundation for the proposed Internet-based Wisconsin Land Information System (WLIS).

Provide a program of technical assistance and advice to state and local governments: Both the WLIB and the Department of Administration's Office of Land Information Services (OLIS) provide assistance to state agencies and local government to further WLIP goals. Technical assistance is also provided in the form of a list-serve (LIO-Tech), which has been in operation for approximately six years. LIO-Tech provides County Land Information Officers (LIOs) and others with a public forum for land records modernization issues.

Provide a program of grants-in-aid to local units of government and review applications for approval: For over a decade, all grant funds available to the Board have been successfully awarded as per the third legislative charge; over \$22 million has been awarded to date for local land record modernization initiatives. A revised administrative rule governing the award of local grants, which became effective June 1, 2000, separates the grants into four categories: base budget, training and education, contribution-based, and strategic initiative.

Develop appropriate policies, standards and guidelines to coordinate the modernization of land records information systems: The WLIB has selected a set of technical and institutional activities, dubbed “foundational elements,” which guide policies and priorities and provide the framework for county land record modernization plans (See Appendix F: Wisconsin Land Information Program Strategic Assessment Matrices). Eleven of the elements are data related, including: geographic reference frameworks; parcels; zoning; soils; wetlands; administrative boundaries; street

²²² Koch et al. 2001, p. 6. See also Vonderhoe, A.P., R.F. Gurda, S.J. Ventura, and P.G. Thum. 1991. *Introduction to Local Land Information Systems for Wisconsin's Future*. Wisconsin State Cartographer's Office, Appendix A

²²³ Koch, T. W., D. Hart, D.D. Moyer, and B. J. Neimann. 2001. *Land Records Modernization Activity in Wisconsin: Impacts, Status and Future Tasks 1990-2000. A Report for the Wisconsin Land Information Board and the Strategic Assessment Task Force*. January 2001. Madison, WI: Wisconsin Land Information Board, p. v.

centerlines and addresses; land use; natural resources; and infrastructure and facilities management. Three elements are institutional, including: organizational arrangements; communications, education and training; and public access arrangements. The WLIP has adopted standards for these foundational elements to be discussed below. All local governments using WLIP funds for project expenditures must comply with these standards.

Review for approval county-wide and state agency plans for land records modernization: Over the last decade, the WLIP has provided guidelines for land records modernization plans, which in turn direct county and state agency modernization activities as funded by the WLIP. In 2000, the WLIP approved a second-generation of county land records modernization plans for all 72 counties and approved agency land integration plans and the GIS components of agency strategic information technology plans for 11 state agencies.

Direct and supervise the Land Information Program: Since 1993, the WLIP has conducted the WLIP Annual Survey to assess the status, progress, and benefits of the land records modernization and to track the allocation of funds in each of Wisconsin's 72 counties.

9) DOA Office of Land Information Services (OLIS), Division of Housing and Intergovernmental Relations, Department of Administration (DOA)

The Wisconsin Department of Administration's Office of Land Information Services (OLIS)²²⁴ supports the Wisconsin Land Information Board (WLIP) and Wisconsin Land Information Program (WLIP) by providing technical assistance, reviewing land records modernization plans, and administering the WLIP grants-in-aid program. In addition, OLIS provides staff support to the Wisconsin Land Council (WLC).

GIS Services provides geographic information systems (GIS) services to state agencies and local government, including GIS data clearinghouse services, consultation, installation/set-up, training, support and custom GIS products.

Plat Review and Municipal Boundary Review, both of which have statutory authority for approval of specific land use related requests, are housed within OLIS. Municipal Boundary Review "regulates the transition of unincorporated areas to city or village status through municipal annexation, incorporation, consolidation, or by joint city-village-town activities involving cooperative boundary plans and agreements. Such agreements may change territorial boundaries and may provide for the sharing of municipal services."²²⁵ Plat Review, on the other hand, "regulates the creation of parcels on subdivision plats and the correction of faulty parcels of record on assessor plats. The goals of Plat Review include promoting the orderly layout of land; facilitating adequate provisions for water, sewerage, road ingress and egress and public access to all navigable water; and certifying technical accuracy, retraceable boundaries and conveyancing by accurate legal description."²²⁶

²²⁴ OLIS website: http://www.doa.state.wi.us/pagesubtext_detail.asp?linksubcatid=359

²²⁵ http://www.doa.state.wi.us/pagesubtext_detail.asp?linksubcatid=330

²²⁶ http://www.doa.state.wi.us/pagesubtext_detail.asp?linksubcatid=199

10) County Land Information Officers Network (LION)

To participate in the WLIP under § 59.72 (3), each county board must designate a Land Information Officer (LIO) who serves as the local coordinator for county-wide land records modernization activities. Alternatively, the county board may select an existing department or organization to perform the functions and duties of this office. The LIO is responsible for writing and implementing a county-wide land information modernization plan and for submitting grants-in-aid proposals once the plan has been approved by the WLIP.

In March 2002, land information officers from around Wisconsin adopted a Constitution and Bylaws, establishing the Land Information Network (LION), the purpose of which is to educate, to facilitate coordination and cooperation, to encourage communication between county, state and federal governments, and to promote the goals of the WLIP.²²⁷

11) State Cartographer's Office (SCO)

Established in 1974 at the University of Wisconsin-Madison by the Wisconsin State Legislature, the State Cartographer's Office (SCO)²²⁸ serves as a spatial data clearinghouse for the state and assists with statewide coordination of land information activities. To fulfill WLIP requirements, the SCO maintains the Wisconsin Land Information Clearinghouse (WISCLINC), which is a Wisconsin node of the National Spatial Data Infrastructure (NSDI). In addition, the SCO compiles an index of aerial photography projects, provides data and tools for locating geodetic control points, and publishes numerous bulletins, handbooks and guides, which cover such topics as mapping, surveying, and land information systems.

12) Wisconsin Emergency Management Division (WEM), Wisconsin Department of Military Affairs

The Wisconsin Emergency Management Division (WEM)²²⁹ has several programs, including Emergency Police Services, Communications, Disaster Planning, Mitigation, Hazmat, EPCRA, and REP. WEM has six regional offices located throughout the state that support both municipal and county programs in planning, training, exercising, response and recovery activities. In addition, regional offices coordinated administrative activities between the Division and local governments. WEM recently completed a GIS user needs assessment of county emergency managers with the assistance of the Office of Land Information Services.

13) Wisconsin Department of Transportation (WisDOT)

Established in 1995, the Local Roads and Streets Council (LRSC)²³⁰ of the Wisconsin Department of Transportation is an advisory board of local officials charged by the Secretary of WisDOT to concentrate on four main areas:

- “Enhance and facilitate communication among various state associations and WisDOT;

²²⁷ Wisconsin Land Information Association. 2002. *Land Records Quarterly* July 2002. 12(3):8.

²²⁸ SCO Website

²²⁹ WEM website: <http://badger.state.wi.us/agencies/dma/wem/index.htm>

²³⁰ LRSC website: <http://www.dot.wisconsin.gov/localgov/lrsc/index.htm>

- Investigate the impact of federal legislation on state policies;
- Evaluate the needs and methods for collecting local road network data and develop policy initiatives based on that data; and
- Review policies which affect local roads and streets, with special emphasis on cost containment.”

Launched in 1996 by the LRSC, the Local Roads Database Initiative, now referred to as the Wisconsin Information System for Local Roads (WISLR), is an effort to modernize the database and mapping system for all local roads in Wisconsin. The WISLR database contains geographic data, functional classifications, pavement ratings, and other characteristics of roadway segments. The WISLR system will join business data to location, consolidate eight separate location systems into a single statewide system, support single entry to update both business and location data, and create a single base map from which various map themes may be produced.

Under Wisconsin Statute § 86.302(2), municipalities and counties are required to submit pavement ratings to WisDOT on a biennial basis. This information is stored in the new local roads database.

14) Wisconsin Land Council (WLC)

Established by the 1997-99 biennial budget, the Wisconsin Land Council (WLC) is charged under Wis. Stats §16.02 with addressing land use related issues including: “identifying state land use goals and priorities; developing procedures for facilitating local land use planning efforts; studying areas of cooperation and conflict in federal, state and municipal land use statutes; establishing technical and policy resource consortia; studying the development of a Wisconsin land information system; and, recommending improvements to land use planning and coordination activities.”²³¹ In addition, the WLC oversees the land use and comprehensive planning grant program, often referred to as “Smart Growth.” Attached to the Wisconsin Department of Administration (DOA) under §15.03, the WLC is composed of 16 members, drawn from local government, state agency secretaries, the private sector, and other interested parties. The WLC has three statutorily defined working groups: the State Agency Resource Working Group (SARWG); and the State-Local Government-Private Sector Working Group (SLPWG).

Of note, in 1999, the former Technical Working Group (TWG) recommended the creation of a project team to develop and implement the Wisconsin Land Information System (WLIS), a statewide system designed to provide private and public users with Internet access to current local government records.

15) Regional Planning Commissions (RPC), Wisconsin Department of Commerce

Regional planning commissions (RPCs) are voluntary associations of governments organized: 1) to prepare plans for the physical, social and economic development of a region and its communities; 2) to provide a forum for communication, cooperation and coordination among federal, state, regional and local interests;

²³¹ WLC and WLIS 2002, p.

and 3) to conduct all types of research studies, to collect and analyze data, to prepare maps, charts and tables, and to conduct all necessary studies for the accomplishment of its other duties; 3) to maintain and provide information on land use, physical features, public facilities, population and economic growth and changes, industrial sites and community profiles; and 4) to offer technical assistance and support [Wisconsin Statute § 66.0309]. As such, RPCs provide land use planning and zoning assistance, economic development strategies, CDBG program assistance, environmental planning, mapping and GIS, transportation plans, and other specialized studies. In addition, RPCs are responsible for the preparation of a master plan for the region. Funding is provided through a combination of state and federal funding, a membership fee provided by a regional tax levy apportioned to each of the member counties on the basis of equalized valuation, and local contracts.

16) Wisconsin Land Information Association (WLIA)

The Wisconsin Land Information Association (WLIA)²³² is “a grassroots organization representing a collection of concerned professionals working to develop, maintain, and apply a network of statewide land information systems.” Over 650 people and 40 businesses from throughout Wisconsin and neighboring states participate in the WLIA.

b. Control Structures

1) Policies

a) Geographic Reference Framework

Several agencies and organizations have custodial and stakeholder roles and responsibilities in regards to the geographic reference framework in Wisconsin. The Wisconsin Department of Transportation (WisDOT) serves as the custodian for geodetic survey information. Geodetic networks are distinguished by the use of redundant, interconnected, permanently monumented control points that comprise the National Spatial Reference System (NSRS) database maintained by the National Geodetic Survey (NGS). WisDOT is responsible for: 1) collecting and processing data on 80 Wisconsin HARN stations; 2) blue booking HARN data and submitting it to the NGS; 3) maintaining and providing access to Wisconsin HARN data; and 4) reviewing and approving county plans for local densification from the HARN. In addition, WisDOT is tasked with coordinating the development and review of standards and policies related to Wisconsin geodetic networks and data, including the compliance with applicable Federal standards.

The Wisconsin Land Information Board (WLIB) is primarily responsible for: 1) developing cost-share policy for geodetic data development; 2) providing cost-share funds as well as WLIP funding for the collection, management, and maintenance of Wisconsin geodetic data; and 3) consulting with WisDOT and the user community to maintain appropriate levels of technical support for Wisconsin geodetic networks and local densification from the HARN.

²³² WLIA website: <http://wisclinc.state.wi.us/>

Counties, on the other hand, are responsible for developing plans for local densification from the HARN, with WisDOT review and assistance and for collecting and processing data on locally densified geodetic networks. The State Cartographer's Office (SCO) serves as the Wisconsin Geodetic Data Center. As such, the SCO provides federal geodetic data distribution services and works cooperatively with counties, the WLIB and WisDOT to provide access to local geodetic data and metadata by creating linkages to the WLIB clearinghouse. Of note, the SCO has recently developed and implemented ControlFinder,²³³ an Internet-based tool for quickly identifying and viewing information on a variety of geodetic control points, including information about control monuments set by the Nation Geodetic Survey (NGS), the United States Geological Survey (USGS), and others.

b) Wisconsin Land Information Program (WLIP)

Administered by the WLIB and DOA Office of Land Information Services (OLIS), the Wisconsin Land Information Program (WLIP) is a voluntary, statewide program that provides financial and technical support to local governments for land records modernization efforts. All seventy-two Wisconsin counties currently participate in the WLIP.

Funding is generated through a seven dollar increase in a user fee collected by the County Register of Deeds Office for the filing of documents, two dollars of which is sent to the WLIB and five dollars of which is kept by the county to fund land information efforts. The county is mandated to spend four dollars of each retained fee on the development, implementation and maintenance of the countywide land records modernization plan. The remaining one dollar is applied to the development and maintenance of a computerized indexing of the county's land information records relating to housing²³⁴ in order to facilitate public access via the Internet. In order to be eligible to retain fees, a county must designate a local Land Information Officer (LIO) and must submit a land records modernization plan for WLIB approval. These plans guide county land records modernization activities. In addition, eleven state agencies must submit plans to the WLIB annually.

As part of the program, the WLIB established foundational elements, including technical foundational elements (geographic reference frameworks; parcels; zoning mapping, soils mapping, wetlands mapping; administrative boundaries; street centerlines; street addresses; land-use mapping; land use mapping, natural resources; database design; and infrastructure and facility management) and institutional foundational elements (institutional arrangements; communication, education, and training; and public access arrangements). County land records modernization plans and the statewide strategic planning process address these foundational elements.

In addition, the WLIB conducts an annual survey to assess the program's progress at the local level. Every county is required to complete this survey under Wisconsin Administrative Code § 47.06(4) to receive WLIP funds. Not only has this survey served as a barometer of the overall effectiveness of the

²³³ <http://www.geography.wisc.edu/sco/geocat/index.html>

²³⁴ According to statute, this includes the housing element of the county's land use plan under s. 66.1001 (2) (b).

WLIP program, it also is an effective tool for communicating program goals and accomplishments to the administration, the Legislature, and the land information community.

After subtracting a percentage for administration costs, the WLIB redistributes its share of these revenues to local governments to provide base funding so that every county has some funding to begin the automation process [Chapter 47 of the Wis. Admin. Code; Wisc. Statutes § 16.004 (1), § 227.11, § 16.967]. During the first six years of the program, these funds were distributed via a competitive grants-in-aid process. In 1996, however, a formula-based approach was adopted such that every county now receives a "base level" of funding (\$35,000 in 2002). Grants that address strategic initiatives, such as digital soils mapping and metadata creation, have been available as well. As a result, some counties receive more monies than they would have generated by fees alone.²³⁵

A county may apply to the WLIB for a grant for the following: 1) the design and implementation of a land information system; 2) the preparation of parcel property maps; 3) the preparation of maps for local planning purposes; 4) systems integration; and 5) training and education in land information systems.

With the adoption of comprehensive planning legislation (§66.1001, Wis. Stats.), some agitated for the diversion of WLIP program revenues from the creation of a spatial data infrastructure to the implementation of statewide land-use planning initiatives. To this end, some advocates tried to persuade former Governor Scott McCallum and the Legislature to merge the WLIB with the newly established Wisconsin Land Council (WLC). Both the WLC and the WLIB were given a new sunset of August 2003 and both were required to file a report to the Governor and the Legislature by September 2002 on the progress of their programs [1997 Wisconsin Act 27, § 9101 (11m)]. The current budget bill extends the sunsets of both the WLC and the WLIB until 2004.

c) **Wisconsin Land Information Clearinghouse (WISCLINC) and the Wisconsin Land Information System (WLIS)**

The Wisconsin Land Information Clearinghouse (WISCLINC) website²³⁶ was created in 1994-95, with funding from the Federal Geographic Data Committee (FGDC), the Wisconsin Land Information Board (WLIB), and the Wisconsin State Cartographer's Office (SCO), in order to establish NSDI Clearinghouse activities as an integral component of the Wisconsin Land Information Program and to provide access to NSDI compliant metadata on primary geospatial data assets maintained by cooperating Wisconsin agencies. Since its inception, the role of WISCLINC has expanded. Today, WISCLINC serves as a "...front door" to geospatial data discovery and dissemination in Wisconsin."

²³⁵ Tulloch, D. and Niemann, B.J. 1996. *Evaluating Innovation: The Wisconsin Land Information Program*. Geo Info Systems, October 1996.

²³⁶ WISCLINC website: <http://wisclinc.state.wi.us>

WISCLINC hopefully will serve as a structural foundation for the proposed Internet-based Wisconsin Land Information System (WLIS), a new initiative authorized by the Legislature in 2001 which is intended to integrate locally generated data into a statewide system.²³⁷ Initial work for WLIS is underway. Estimates suggest an \$8 million dollar investment will be needed for this effort.

d) Digital Orthophotography

One of the goals of the WLIP is the acquisition of digital orthophotography for the entire state. Agencies at the local, state, and federal levels have supported this effort, including the U.S. Geological Survey (USGS), the Natural Resources Conservation Services (NRCS), and the U.S. Forest Services (USFS), as well as the Wisconsin Department of Natural Resources, regional planning commissions, counties and municipal governments.

Two products were generated: digital orthophoto quarter quads (DOQQs) and county-based digital orthophotos. The DOQQs, a product of the USGS which are based on aerial photography flown as part of the National Aerial Photography Program (NAPP), have been obtained for the entire state. The DOQQs have a 1-m horizontal resolution and are largely based on black and white photography. In addition, roughly 42 counties have acquired digital orthophotography above and beyond the DOQQs.²³⁸ These county-based digital orthophotos have resolutions ranging from 6" to 1-m pixels.

e) Comprehensive Land Use Planning

While local governments control local land use planning and decision making, the state comprehensive planning law (§ 66.1001, Wis. Stats.) provides direction about the content of and process for adopting a comprehensive land use plan. In addition, state agencies are encouraged to incorporate the fourteen local comprehensive planning goals into their programs, policies, infrastructure and investments (§1.13 (2), Wis. Stats.).²³⁹

2) Statutes

The 1989 Wisconsin Legislature created the Wisconsin Land Information Program (WLIP) and the Wisconsin Land Information Board (WLIB) in the 1989 Budget Bill, Act 31. Subsequently, Act 339, enacted the following year, provided funding and staff support for the program. In addition, this legislation provided for the establishment of county land information offices [Wisconsin Statutes 15.105(16a-c), 16.967(1-9), 59.51 (21), 59.57, 59.88 (1-5)].

Funding for the WLIP is generated through an increase in the document recording fee collected by the County Register of Deeds Office under § 59.43 (2) (a) 1. and (e). A portion of this fee is sent to the WLIB, where it is held in a segregated account and is later distributed to local governments via a grants-in-aid program for local land records modernization efforts. All grants are guided by, ch. Adm 47, Wis. Admin. Code, and comply with §16.967(7), Stats. A county board that has established a land information office under § 59.72 (3), Wisc. Stats. may apply to

²³⁷ Wisconsin Land Council Technical Working Group Report. 1999. WLIS Project Team Report. 2000.

²³⁸ Hart, D. A. 2002. The Status of the Wisconsin Land Information Program. Unpublished draft.

²³⁹ The Wisconsin Land Council's Recommendation for State Land Use Goals. September 2002.

the board on behalf of any local governmental unit [§16.967(7)(a) Stats.] This funding source, however, is scheduled to “sunset” on September 1, 2003 by 1997 Wisconsin Act 27, Section 9101.

Statutes relevant to the Wisconsin Land Information Program are enumerated in Appendix E: Wisconsin Statutes Applicable to the Land Information Program, or alternatively may be found at:

http://www.doa.state.wi.us/dhir/documents/WLIP_statutes_applicable.pdf.

See also ch. Adm 47, Wis. Admin. Code: Wisconsin Land Information Program Grants-In-Aide to Local Government: http://folio.legis.state.wi.us/cgi-bin/om_isapi.dll?clientID=93450&infobase=code.nfo&jump=ch.%20Adm%2047

3) Funding and Costs

As noted in a recent report *Land Information Modernization Activity in Wisconsin: Impacts, Status and Future Tasks 1990-2000* (2001; see Table 6: Estimate of Annual Costs of Maintaining Land Records in Wisconsin: 1990-1999), the annual costs to maintain land records for all levels of government and private utilities have increased significantly.²⁴⁰ Over the last decade, the total costs to maintain the existing land records system have totaled \$2.06 billion, roughly \$1.0 billion of which has been borne by the counties. Wisconsin Land Information Program (WLIP) funds, totaling more than \$71 million for this same ten-year period, amount to only 3.5% of the ongoing land records costs.

Table 6: Estimate of Annual Costs of Maintaining Land Records in Wisconsin: 1990-1999²⁴¹

Year	Local Government Cost (Millions of Dollars)	Total Cost (2) (Millions of Dollars)
1990	\$94	\$180
1991	98	187
1992	101	193
1993	104	199
1994	107	203
1995	110	210

²⁴⁰ Koch, T. W., D. Hart, D.D. Moyer, and B. J. Niemann. 2001. *Land Records Modernization Activity in Wisconsin: Impacts, Status and Future Tasks 1990-2000. A Report for the Wisconsin Land Information Board and the Strategic Assessment Task Force*. January 2001. Madison, WI: Wisconsin Land Information Board, p. 3.

See also:

Clapp, J., D.D. Moyer, B.J. Niemann Jr., C. Reinhard and B. Weisman. 1987. *Final Report of the Wisconsin Land Records Committee: Modernizing Wisconsin's Land Records*, Wisconsin Land Records Committee.

Larsen, B.J., J.P. Clapp, A.H., Miller, B.J. Niemann Jr., and A.L. Ziegler. 1978. *Land Records: The Cost to the Citizen to Maintain the Present Land Information Base: A Case Study of Wisconsin*. Madison, Wisconsin: Wisconsin Department of Administration.

²⁴¹ Koch et al. 2001.

Year	(Millions of Dollars)	(Millions of Dollars)
1996	113	216
1997	116	221
1998	117	224
1999	120	229
TOTAL	1,080	2,062
(1) Based on 1976 Wisconsin Dept. of Administration study costs, inflated by Consumer Price Index.		
(2) Local, State and Federal Government, plus private utilities.		

As stated above, funding for the WLIP is generated through an additional seven dollar fee collected by the County Register of Deeds Office for the first page of each instrument that is recorded under § 59.43 (2) (ag) 1. and (e). Two dollars of this retained fee is sent to the WLIP, where it is held in a segregated account and is later distributed to local governments via a grants-in-aid program for local land records modernization efforts [ch. Adm. 47, Wis. Admin. Code; Wisc. Stats. §16.004 (1) , § 227.11, § 16.967].

The remaining five dollars of each retained fee is kept by the county. The county is mandated to spend four dollars of each retained fee on the development, implementation and maintenance of the countywide land records modernization plan. The remaining one dollar is applied to the development and maintenance of a computerized indexing of the county's land information records relating to housing²⁴² in order to facilitate public access via the Internet. In order to be eligible to retain fees, a county must have a locally designated Land Information Officer (LIO) and submit a land records modernization plan for WLIP approval every five years. To date, all 72 counties in Wisconsin have met these requirements. This funding source is scheduled to "sunset" on September 1, 2003 by 1997 Wisconsin Act 27, Section 9101; however, the current budget proposes extending this sunset another two years.

Through the recording fee, the WLIP generates approximately \$7-million per year, depending on fluctuations in the real estate market and interest rates.²⁴³ Since the program's inception, the WLIP has generated over \$90-million dollars, which includes fees retained by the county as well as those submitted to the state.

Since the inception of the WLIP grants-in-aid program in 1991, the WLIP has awarded \$22,139,852 to local governments for local land information programs, land information systems and parcel property mapping, as well as for other associated foundational elements. The WLIP makes awards annually for:

²⁴² According to statute, this includes the housing element of the county's land use plan under s. 66.1001 (2) (b).

²⁴³ Koch, T. W., Hart, D.A., Moyer, D.D., and Niemann, B.J. 2001. Land Information Modernization Activity in Wisconsin: Impacts, Status and Future Tasks 1990-2000. A Report for the Wisconsin Land Information Board and the Strategic Assessment Task Force. Madison, Wisconsin. p. 11.

- “Contribution-Based Grants provide funds for land records modernization based on county contributions to the WLIP;
- Land Information Base-Budget Grants guarantee that all counties have access to a minimum funding level of \$35,000 for implementation of local land information programs;
- Training and Education Grants guarantee funding to all counties to acquire the skills necessary to implement their local land information programs, i.e., GIS/LIS software training, technical workshops, etc; and
- Strategic Initiative Grants provide funding for projects of statewide or regional importance within the WLIP. For the 2000 cycle, the WLIP allocated \$100,000 to create metadata documentation. For the 2001 cycle, the WLIP allocated \$566,000 for counties to develop parcel assessment and tax data for public access via the Internet. For the 2002 cycle, various initiatives are currently being explored such as accelerated parcel mapping modernization, publication of parcel assessment and tax data on the internet, base data creation for floodplain mapping and a WLIS node pilot.”²⁴⁴

In the 2002 Budget, Governor Scott McCallum eliminated \$200,000 from the Department of Administration’s Office of Land Information Services (OLIS), transferred \$400,000 of WLIP funds to the state’s General Purpose Revenue fund to help balance the overall budget, and transferred \$500,000 of WLIP funds to the Comprehensive Planning Grants Program, administered by the Wisconsin Land Council (WLC).²⁴⁵

A strategic partnership between the USDA Natural Resource Conservation Service (NRCS), the Wisconsin Land Information Board (WLIP), and various state agencies resulted in the acquisition of digital orthophotography for the entire state and will result in complete digital soils mapping by 2005, if sufficient funding can be acquired. Two-thirds of the funding (\$8-million) for these efforts came from the NRCS; the remaining one-third (\$4-million) was supposed to be generated from WLIP funds (\$415,000 annually for six years, or \$2,490,000 total) and state agencies (\$1,710,000 from DOT, DNR and the Board of Commissioners of Public Lands). However, recent budget cuts have left this nationally innovative program in peril unless replacement funds can be found to continue.

4) Standards

In 1991, the Wisconsin Land Information Board (WLIP) developed a set of recommendations and requirements for land records modernization, which in 1997 evolved into the *Uniform Instructions for Preparing County and State Agency Land Information Modernization Plans*.

Modernization activities in Wisconsin are guided by 15 “foundational elements” around which a variety of technical standards have been developed. In order to receive WLIP funds for project expenditures or to retain fees, local governments must comply with these standards.

²⁴⁴ Wisconsin Land Council and Wisconsin Land Information Board. 2002. Report to the Governor and Legislature. An Evaluation of the Functions, Activities, and Future Directions. September 2002. Madison, WI. p. 12.

²⁴⁵ http://www.geography.wisc.edu/sco/news/briefs_story.php?news_id=9

In 2000, the WLIP adopted a standard for the collection of metadata. Additional WLIP standards currently in effect include:²⁴⁶

- WLIP Specifications and Guidelines to Support Densification of the Wisconsin High Accuracy Reference Network (HARN) Using Global Positioning Systems (GPS) Technology
- Corner Remonumentation (§. 59.74(1) and §. 60.84(3)(c), Wis. Stats.)
- Remonumentation Records (§. 59.74(1), Wis. Stats., and §. AE 7.08(2), Wis. Admin. Code)
- FGCC Third Order Class I (coordinate values on PLSS corners)
- FGCC Third Order Class II (horizontal and vertical control values)
- WLIP's Parcel Identification Numbering System
- Natural Resources Conservation Service Compliant (Soils Mapping)
- WI DNR Wetlands Map (§. 23.32, Wis. Stats.)
- Dept. of Revenue Land Use Classification System
- DNR Classification of Land Cover (from satellite imagery)
- Recommendations for the Minimum and Alternative Procedures for Competitive Procurement Processes to Ensure Best Value for Citizens and Governments
- FGDC's Content Standard for Digital Geospatial Metadata
- State Agency Enterprise Standards for Desktop and Workstation

The Unique Parcel Identification Numbering System Standard adopts elements of the Wisconsin Department of Revenue's parcel numbering system and is tied to the Public Land Survey System (PLSS).²⁴⁷ However, a parcel mapping data model content standard needs to be developed.

The Wisconsin Land Information Association (WLIA) also has developed a set of standards and guidelines, with the help of the land information community.²⁴⁸ These standards, however, are not mandatory. Technical standards include:

- Standard on Standard – A methodology for WLIA to adopt standards that support geographic and land information systems implementation in Wisconsin;
- Parcel Geo-Locator Standard – A standardized geographic locator for parcels of all types utilizing the Wisconsin Land Information Board recommended numbering scheme thereby facilitating data exchange;

²⁴⁶ WLIP Standards: http://www.doa.state.wi.us/pagesubtext_detail.asp?linksubcatid=478

²⁴⁷ Wisconsin Department of Revenue. 1990. *Property Assessment Manual*.

²⁴⁸ WLIA Standards: <http://www.wlia.org/standards.html>

- Document Definitions Resource – A resource that serves as a standard set of definitions for documents routinely recorded in the office of the register of deeds;
- Geodetic Control Clearinghouse – An examination of the issues involved with geodetic control information distribution, sharing and database management;
- GIS Data Exchange Between Wisconsin Public Agencies;
- Digital Parcel Mapping Data Content Standards;
- PLSS Database Definitions; and
- Geospatial Metadata.

In addition, the Wisconsin Land Information Association (WLIA) is in the process of developing an Information Policy Handbook.²⁴⁹ To date, chapters on *Data Distribution* and on *Privacy & Open Records* have published on the Internet.

c. Issues and Opportunities

From a county perspective, the Wisconsin Land Information Program (WLIP) has been very successful, resulting in fully functional land information systems at the local level. Every county in Wisconsin participates in the WLIP, which clearly has accelerated the automation of parcel mapping. Approximately 60 of the 72 counties have modern indexing and imaging systems for their recorded real estate documents. As of 2001, 76% of the approximately 3.1 million parcels have been digitally mapped.²⁵⁰ In addition, all counties have access to GIS or CAD software and to trained personnel.²⁵¹

From a statewide perspective, however, the program has not been as effective. Unfortunately, there has been an overall lack of will to enforce standards statewide, to track federal standards development, or to enforce state agency cooperation and coordination through agency budgeting controls. Standards are a critical factor in the success of a land records modernization program. Initially, Wisconsin counties and municipalities were given broad leeway so as to encourage full participation in the WLIP; but, this policy resulted in 72 county systems that cannot be integrated or compared across boundaries. In hindsight, standards regarding coordinate systems, parcel identification numbers, street addressing, land use classifications, and orthophotography should have been developed and enforced at the inception of the program.²⁵²

From the beginning, the WLIP should have provided funding to state agencies for the development of data relevant to both local and state governments. In the future, the WLIP will need "to more formally encourage or require various state agencies to foster the modernization of various WLIP foundational elements (i.e., DNR: hydrography, environmental corridors, stormwater/floodplain mapping; DOT: street addresses and centerlines; DOR: parcel IDs, land use, zoning, integrated tax assessment procedures,

²⁴⁹ WLIA Information Policy Handbook: <http://www.wlia.org/standards/InfoPolicy.htm>

²⁵⁰ Hart, D. A. 2002. Status of the Wisconsin Land Information Program. Unpublished Draft.

²⁵¹ WLIP Survey: http://www.doa.state.wi.us/pagesubtext_detail.asp?linksubcatid=475

²⁵² Koch, T. W., D. Hart, D.D. Moyer, and B. J. Niemann. 2001. *Land Records Modernization Activity in Wisconsin: Impacts, Status and Future Tasks 1990-2000. A Report for the Wisconsin Land Information Board and the Strategic Assessment Task Force*. January 2001. Madison, WI: Wisconsin Land Information Board.

etc.; DATCP: agricultural use, prime farmland; and DOA: administrative boundaries and census information)." In addition, state agencies, such as the WDNR, WDOT, and WDOA, should strengthen their relationship with regional planning commissions, which, over the last decade, have become important coordinators of local land information activities.²⁵³

Also of great importance is fostering a policy of open access to spatial data produced through the land records modernization program. As demonstrated in the case study *The Acquisition and Integration of Local Government Spatial Data Used to Analyze Alternative Coastal-Development Setback Policies for the Lake Michigan Coast of Wisconsin*,²⁵⁴ the trend to copyright and license spatial data may become a greater obstacle to regional and statewide data integration projects than a lack of consistent standards. According to the 2001 WLIP Survey, at least a third of the counties in Wisconsin place restrictions on the subsequent use and dissemination of their spatial data, despite Wisconsin's open-record statutory provisions and WLIP grants-in-aid contracts. As a result, Koch et al. (2002) recommend litigating early in the land records modernization process to challenge the use of copyright and cost-recovery mechanisms.

The WLIP has suffered from a few other shortcomings. While the WLIP is a high-level policy board, it would benefit from having additional members with technical backgrounds. Ad hoc committees lacking clear mandates, timelines, or deliverables have not achieved initial high expectations; focused workgroups with clearly defined objectives, on the other hand, have been well worth the time and effort. Furthermore, more time should have been spent on engaging and training non-technical professionals, such as planners, realtors, and interested citizens. Finally, the program might have benefited from looking outside the state for innovations.

That said, the Wisconsin Land Information Program (WLIP) fee structure has worked well and the legislative program and funding sunsets have helped to keep the community focused on moving forward and producing tangible results. Benefits of the WLIP include statewide digital orthophotography, statewide digital elevation data, a High Accuracy Reference Network (HARN), and a focused floodplain mapping effort.²⁵⁵ Nearly half of all counties have had their soil surveys digitized and certified by the NRCS. Specific benefits include: 1) a reduction in land transfer costs²⁵⁶; 2) a reduction in flood insurance costs²⁵⁷; 3) the expedition of natural disaster mitigation and management support; and 4) the facilitation of comprehensive planning.

²⁵³ Wisconsin Land Council and Wisconsin Land Information Board. 2002. *Report to the Governor and Legislature: An Evaluation of the Functions, Activities and Future Directions*. September 2002. Madison, WI, p. 23.

²⁵⁴ Hart, D. A. 2000. *Building a Horizontally and Vertically Integrated Coastal GIS Using Local Government Spatial Data: The Case of Coastal Erosion Hazards on the Lake Michigan Coast of Wisconsin*. PhD. Dissertation, University of Wisconsin-Madison, 294 pp.

²⁵⁵ Koch, T., Krauskopf, T., Miller, A., Moyer, D. D., Niemann, B., and Ventura, S. 2002. *Status of Land Records Modernization in Wisconsin: Then (circa 1960-70's) and Now (2002)*, Forty Years of Vision: URISA Activities over the Years, Annual Meeting of the Urban and Regional Information Systems Association (URISA), October 29, 2002.

²⁵⁶ The Dane County Register of Deeds reported an annual savings of \$6 million dollars per year (Licht 1998).

²⁵⁷ Winnebago County noticed a decrease in floodplain mapping and flood insurance costs, with an annual savings of over \$14 million for 1100 buildings over the life of a 30-year mortgage. In addition, the affected properties have increased in real estate values by more than \$10 million dollars (Schmidt and Lulloff 1998).

New applications and uses of modernized land record systems are now emerging, particularly in the areas of comprehensive planning, public-safety and emergency government applications. At the present time, however, no one is systematically integrating the activities of Hazard Mitigation, Emergency Management, E-911, and Disaster Response with the Wisconsin Land Information Program on a statewide basis. Wisconsin would also benefit from actively coordinating with the National Emergency Number Association (NENA).

With the comprehensive planning legislation and the creation of the Wisconsin Land Council in 1999, counties have received over \$6-million dollars in planning grants [1999 Wisconsin Act 9] and the availability of digital land-use data is likely to increase as a result. However, as the 2001 WLIP survey indicates, land-use classifications and mapping methods vary considerably across the state. Classification systems range from the Wisconsin Department of Revenue Land Use Tax Assessment Classification System, the Southeast Wisconsin Regional Planning Commission land-use classification system, and the Federal Highway Administration and Department of Housing Standard Land-Use Coding Manual to over 21 individual county-created systems. Needless to say, the lack of enforced statewide land-use classification and mapping standards will greatly limit future monitoring of statewide land-use trends and changes.²⁵⁸

Finally, several Federal opportunities have emerged. Foremost among them are two key initiatives promoted by the Federal Office of Management and Budget (OMB) and the Federal Geographic Data Committee (FGDC): 1) Implementation Teams (I-Teams), which requires states to prepare a comprehensive plan for compiling, maintaining, and financing the spatial infrastructure in the state, and 2) the Geospatial One-Stop. In addition, the Bureau of Land Management (BLM) is facilitating an initiative to improve and standardize cadastral mapping nationally. Other areas of opportunity include the National Map Project (U.S. Geological Survey), Flood Mapping Modernization Initiative (Federal Emergency Management Agency), Tiger/Master Address File Enhancement Project (Bureau of the Census), and the 133-Cities Initiative and Homeland Security Grants (National Imagery and Mapping Agency & FEMA).

²⁵⁸ Hart, D. A. 2002. The Status of the Wisconsin Land Information Program. Unpublished draft.

C. Institutional Models: Brief Profiles

1. Indiana

a. Administrative Structures/Coordination Structures and Procedures

In Indiana, land information is collected and maintained locally by a variety of offices including the Township Assessor, Municipal Records, County Auditor, County Recorder, Clerk of Circuit Court, Emergency Services and County Surveyor. The responsibility for documenting real property sits with County Recorder, but this process must be in coordination with the Township Assessors and County Auditor. The assessment procedure for real property, including electronic records,²⁵⁹ is determined by the Indiana Department of Local Government Finance [Indiana Code Annotated IC 6-1.1-4].²⁶⁰ The Township Assessors are responsible for the assessment of real property [Indiana Code Annotated IC 36-6-5]²⁶¹ and must report once annually to the County Auditor. The County Auditor, in turn, must maintain the electronic records annually reported by the Township Assessors [Indiana Code Annotated IC 36-2-9(20)].²⁶² The County Auditor endorses parcel(s) in property record (transaction) as taxable or not, and checks that the parcel(s) has an ID number before it is entered by the County Recorder [Indiana Code Annotated 36-2-9(18)].²⁶³ There is no official coordinator of land information activities at the local level.

The Indiana Department of Local Government Finance has statewide oversight of property tax assessment and local government budgeting. Local Government Finance required that all counties report their tabular data in a consistent electronic format by the end of 2002.

Indiana has several organizations that guide statewide land records modernization efforts, including: 1) the Indiana Department of Local Government Finance; 2) the Indiana Geographic Information Council (IGIC); 3) the Indiana Government GIS Task Force; and 4) Office of the Indiana State Geodetic Advisor (OISGA).

The Department of Local Government Finance²⁶⁴ was established on January 1, 2002, and assumed most of the functions of the State Board of Tax Commissioners. Local Government Finance is responsible 1) “for ensuring that laws regarding property tax assessment and local government budgeting are carried out properly”; 2) “for publishing rules governing property tax assessment”; 3) “for annually review[ing] and approv[ing] the tax rates and levies of every political subdivision in the state, including all counties, cities, towns, townships, school corporations, libraries, and other entities

²⁵⁹ Indiana State Law regarding the electronic reporting of assessment information:

<http://www.in.gov/legislative/iac/t00500/a00120.pdf>

²⁶⁰ Indiana Code Annotated IC 6-1.1-4 <http://www.in.gov/legislative/ic/code/title6/ar1.1/ch4.html>

²⁶¹ Indiana Code Annotated IC 36-6-5 <http://www.in.gov/legislative/ic/code/title36/ar6/>

²⁶² Indiana Code Annotated IC 36-2-9(20) <http://www.in.gov/legislative/ic/code/title36/ar2/ch9.html>

²⁶³ Indiana Code Annotated 36-2-9(18) <http://www.in.gov/legislative/ic/code/title36/ar2/ch9.html>

²⁶⁴ Indiana Department of Local Government Finance website: <http://www.in.gov/dlgf/>

with tax levy authority”; 4) for “gather[ing] and analyz[ing] data relating to property taxation,... maintain[ing] databases, and periodically... report[ing] on taxation to the General Assembly.”

Governor Frank O'Bannon signed a Proclamation²⁶⁵ signed in 2000 recognizing the establishment of and the participation by the state in the Indiana Geographic Information Council. The proclamation instructed the IGIC to “develop and recommend policies, standards, guidelines and strategies that emphasize cooperation and coordination among Indiana GIS users, federal agencies and other states that are developing and implementing geographic information systems, in order to maximize the value and cost-effectiveness of geographic data and technologies and to avoid redundant activities...” The IGIC serves as the official statewide coordinating body of the Indiana GIS Initiative and the Indiana Government GIS Task Force.

State agency GIS coordination and strategic planning is the purview of the State GIS Coordinator and the Indiana State Government GIS Task Force. The State GIS Coordinator operates out of the Information Technology Oversight Commission's²⁶⁶ (ITOC) offices and reports directly to the state's Chief Information Officer, who also serves as the Director of ITOC. In addition, the State GIS Coordinator serves as the permanent secretary of the Indiana Geographic Information Council and chairs the Indiana Government GIS Task Force. The Indiana Government GIS Task Force,²⁶⁷ created in 1999 by the Information Technology Oversight Commission, is “a collaborative effort of state agencies to foster the efficient use of state GIS resources and [to] provide geographic data in usable forms to the citizens of Indiana.” The Indiana State Government GIS Task Force also works closely and cooperatively with the IGIC on statewide coordination of GIS activities and data development.

The State Geodetic Advisor²⁶⁸ is appointed by and serves at the discretion of Purdue University [Indiana Annotated Code IC 32-19-4-1]. Under Indiana Annotated Code IC 32-19-4-2,²⁶⁹ the Geodetic Advisor “is responsible for the implementation of a new system of geodetic control monuments in the form of a high accuracy geodetic reference network that is part of the National Spatial Reference System and that meets the needs of geodetic and geographic information users.” Furthermore, the geodetic adviser coordinates and assists in the following:

- “The design of the geodetic reference network;
- The establishment of any geodetic reference monument;
- The maintenance of data base control stations, to the extent that funding is available;
- The establishment and implementation of quality control and quality assurance programs for the geodetic reference network; and
- The assistance and training of users of the geodetic reference network.”

Statewide professional organizations, such as the Indiana GIS Initiative (INGISI), the Indiana Society of Professional Land Surveyors (ISPLS), the Association of Indiana

²⁶⁵ 2000 Proclamation: <http://www.in.gov/ingisi/pdf/proclam.PDF>

²⁶⁶ Indiana Information Technology Oversight Commission: <http://www.in.gov/itoc/>

²⁶⁷ Indiana State Government Task Force Strategic Plan: http://www.in.gov/itoc/html_site/gis/

²⁶⁸ Office of the State Geodetic Advisor: <http://bridge.ecn.purdue.edu/~oisga/>

²⁶⁹ Indiana Annotated Code IC 32-19: <http://www.in.gov/legislative/ic/code/title32/ar19/ch4.html>:

Counties, the Association of Indiana Towns, the University GIS Alliance (UGISA), actively participate in GIS activities and coordination across the state in addition to providing guidance, education and training. The state is considering the creation of regional coordinating bodies, using the Northwest Indiana Geographic Information Forum as a model.

Major state and federal land owners and administrators, and hence key custodians for parcel information, include the Indiana Department of Natural Resources (IDNR), the Indiana Department of Transportation (INDOT), and the Department of Administration's State Land Office, as well as the US Forest Service. The Farm Service Agency also maintains records on parcel information. Currently, there is no overall coordination of this parcel information.

b. Control Structures

1) Policies

a) Geographic Reference Framework

(1) Public Land Survey System

In Indiana, the Public Land Survey System (PLSS) serves as the structure around which all legal descriptions of land parcels are based. The Public Land Survey Section Corner Perpetuation Fund is derived from an additional five dollars charged for each deed recorded in the County Recorder's Office [Indiana Annotated Code IC 36-2-7-10 (7); IC 36-2-12].²⁷⁰ This fund may be spent by county surveyors for monumentation under the provisions of Indiana Annotated Code IC 32-19-4-3 or IC 36-2-12-11(e). County surveyors are assisted by the Office of the Geodetic Advisor.

(2) Geodetic Control

The Indiana High Accuracy Reference Network (HARN) consists of 148 stations, seventeen of which have been by the National Geodetic Survey as Federal Base Network (FBN) stations. Each of the Indiana counties has at least one HARN station. The creation of the HARN was a cooperative effort by the NGS, the INDOT, Indiana Department of Environmental Management (IDEM), the Office of the Indiana State Geodetic Advisor (OISGA), and others.²⁷¹

b) Parcel Specific Information

In Indiana, parcel data development is the responsibility of individual counties. Roughly 20 to 25 counties out of 92 have completed parcel mapping in GIS as of 2002. The remaining counties are in various stages of GIS development. At the present time, no statewide parcel data content standards exist.

²⁷⁰ Indiana Annotated Code IC 36-2-7: <http://www.in.gov/legislative/ic/code/title36/ar2/ch7.html>

Indiana Annotated Code IC 36-2-12: <http://www.ai.org/legislative/ic/code/title36/ar2/ch12.html#IC36-2-12-11>

²⁷¹ http://www.in.gov/ingisi/plan/Section4_8_01.pdf

The Indiana Geographic Information Council (IGIC) established itself as Indiana's I-Team in January 2001. Indiana's I-Team Report presents a plan for the development and long-term maintenance for each framework theme listed in Table 7: Indiana Framework Data Initiative Themes.²⁷²

Table 7: Indiana Framework Data Initiative Data Themes

FGDC Framework Data	Indiana Priority Data Sets
Cadastral	Soils
Digital Orthoimagery	Geology
Elevation & Bathymetry	
Geodetic Control	
Governmental Units	
Hydrography	
Transportation	

c) Digital Orthophotography

Indiana obtained a complete first generation seamless coverage of Digital Orthophoto Quads (DOQQs) for the state at 1-meter resolution as part of the USGS' National Digital Orthophoto Program during 1997-1999.²⁷³

d) Local Roads/Addressing

The Indiana Department of Transportation maintains a GIS and certified roads database, which employs a linear referencing system based on county log mile, cumulative log miles, and referencing posts and which has been geographically rectified to Indiana's DOQQ's.

Emergency Services are responsible for addressing at the local level. At the present time, there is neither a central repository nor statewide standards for addressing.

²⁷² http://www.in.gov/ingisi/plan/Section3_8_01.pdf

²⁷³ The National Aerial Photography Program (NAPP) imagery and NAPP-like photography are the primary sources of aerial photography used in the production of 1-meter digital orthophotos for the National Digital Orthophoto Program (NDOP). Refer to http://www.in.gov/ingisi/plan/Section4_8_01.pdf

2) Statutes

a) Indiana Geographic Information Council (IGIC)

The Indiana Geographic Information Council and the State GIS Coordinator are recognized in a 2000 Proclamation by Governor O'Bannon.²⁷⁴

b) County Recorder's Fee and County Surveyor's Corner Perpetuation Fund

Indiana Annotated Code IC 36-2-7-10 County Recorder's Fee

"Sec. 10. (a) The county recorder shall tax and collect the fees prescribed by this section for recording, filing, copying, and other services the recorder renders, and shall pay them into the county treasury at the end of each calendar month. The fees prescribed and collected under this section supersede all other recording fees required by law to be charged for services rendered by the county recorder.

(b) The county recorder shall charge the following:

(1) Six dollars (\$6) for the first page and two dollars (\$2) for each additional page of any document the recorder records if the pages are not larger than eight and one-half (8 1/2) inches by fourteen (14) inches.

(2) Fifteen dollars (\$15) for the first page and five dollars (\$5) for each additional page of any document the recorder records, if the pages are larger than eight and one-half (8 1/2) inches by fourteen (14) inches.

(3) For attesting to the release, partial release, or assignment of any mortgage, judgment, lien, or oil and gas lease contained on a multiple transaction document, the fee for each transaction after the first is the amount provided in subdivision (1) plus the amount provided in subdivision (4) and one dollar (\$1) for marginal mortgage assignments or marginal mortgage releases.

(4) One dollar (\$1) for each cross-reference of a recorded document.

(5) One dollar (\$1) per page not larger than eight and one-half (8 1/2) inches by fourteen (14) inches for furnishing copies of records produced by a photographic process, and two dollars (\$2) per page that is larger than eight and one-half (8 1/2) inches by fourteen (14) inches.

(6) Five dollars (\$5) for acknowledging or certifying to a document.

(7) Five dollars (\$5) for each deed the recorder records, in addition to other fees for deeds, for the county surveyor's corner perpetuation fund for use as provided in IC 32-19-4-3 or IC 36-2-12-11(e).

²⁷⁴ <http://www.in.gov/ingisi/pdf/proclam.PDF>

(8) A fee in an amount authorized under IC 5-14-3-8 for transmitting a copy of a document by facsimile machine.

(9) A fee in an amount authorized by an ordinance adopted by the county legislative body for duplicating a computer tape, a computer disk, an optical disk, microfilm, or similar media. This fee may not cover making a handwritten copy or a photocopy or using xerography or a duplicating machine.

(10) A supplemental fee of three dollars (\$3) for recording a document that is paid at the time of recording. The fee under this subdivision is in addition to other fees provided by law for recording a document.

(c) The county treasurer shall establish a recorder's records perpetuation fund. All revenue received under subsection (b)(5), (b)(8), (b)(9), and (b)(10) shall be deposited in this fund. The county recorder may use any money in this fund without appropriation for the preservation of records and the improvement of record keeping systems and equipment.

(d) As used in this section, "record" or "recording" includes the functions of recording, filing, and filing for record.

(e) The county recorder shall post the fees set forth in subsection (b) in a prominent place within the county recorder's office where the fee schedule will be readily accessible to the public.

(f) The county recorder may not tax or collect any fee for:

(1) recording an official bond of a public officer, a deputy, an appointee, or an employee; or

(2) performing any service under any of the following:

(A) IC 6-1.1-22-2(c).

(B) IC 8-23-7.

(C) IC 8-23-23.

(D) IC 10-5-4-3.

(E) IC 10-5-7-1(a).

(F) IC 12-14-13.

(G) IC 12-14-16

(g) The state and its agencies and instrumentalities are required to pay the recording fees and charges that this section prescribes."

c) Property Reassessment Fund

Indiana Annotated Code IC 6-1.1.4-27.5.b

"Sec. 27.5. (a) The auditor of each county shall establish a property reassessment fund. The county treasurer shall deposit all collections resulting from the property taxes that the county is required to levy under this section in the county's property reassessment fund.

(b) With respect to the general reassessment of real property which is to commence on July 1, 2004, the county council of each county shall, for property taxes due in the year in which the general reassessment is to commence and the two (2) years immediately preceding that year, levy against all the taxable property of the county an amount equal to one-third

(1/3) of the estimated cost of the general reassessment....”

Indiana Annotated Code IC 6-1.1.4-28.5 Property reassessment funds; use of money; soil maps; approval of appropriations

“Sec. 28.5. (a) Money assigned to a property reassessment fund under section 27.5 of this chapter may be used only to pay the costs of:

(1) the general reassessment of real property, including the computerization of assessment records;

(2) payments to county assessors, members of property tax assessment boards of appeals, or assessing officials under IC 6-1.1-35.2;

(3) the development or updating of detailed soil survey data by the United States Department of Agriculture or its successor agency;

(4) the updating of plat books; and

(5) payments for the salary of permanent staff or for the contractual services of temporary staff who are necessary to assist county assessors, members of a county property tax assessment board of appeals, and assessing officials.”

3) Funding and Costs

The State GIS Coordinator’s position was created through a one time funding allotment. A cost recovery program is being considered and individual federal and state grant opportunities will be leveraged to fund this office in the future. The State GIS Coordinator’s position was created as a result of the hard work and dedication of Dr. Jill Saligoe-Simmel, chair of the Indiana Geographic Information Council Chair, who volunteered her time for many years. Dr. Saligoe-Simmel is currently funded through a combination of individual grants and contracts.

The cost of parcel mapping is borne locally by county governments. An estimated \$12 million dollars will be required to create a complete statewide parcel layer for the state of Indiana, based on a cost of \$7.00 per parcel for data conversion and an additional \$0.50 per parcel to bring existing digital parcels to a state standard. This figure does not include ongoing maintenance.

The DOQQs cost of approximately \$800.00 per quarter quad. The United States Geological Survey, Natural Resources Conservation Service, and Farm Services Agency spent \$2,500,000 for the 1998-1999 statewide coverage for Indiana. Complete coverage of second generation DOQQs would cost approximately \$4,928,000.

4) Standards

The Federal Geographic Data Committee (FGDC) has adopted a standard for metadata called the Content Standard for Digital Geospatial Metadata. The Indiana Geographic Information Council developed a set of recommendations for metadata based on a two-tier approach that takes into consideration a user’s ability to conform to the federal standard.²⁷⁵ The IGIC Data Standards and Recommendations Committee also has published guidelines and

²⁷⁵ http://www.in.gov/ingisi/metadata/metadata_standard.html

recommendations on *“Projections, Datum, and Coordinate Systems”* and *“Map Scale and Accuracy”* standards.

c. Issues and Opportunities

Roughly one third of the counties in the state have completed digital parcel mapping; this represents roughly two-thirds of the population.

Until recently, efforts have largely met the immediate needs of individual programs and agencies. There is recognition of the overlap that exists and a growing movement towards finding statewide solutions. The opportunity to leverage individual program dollars at the federal, state and local levels is tremendous.

Ultimately, the GIS community will need to do a better job of engaging subject matter experts and business leaders within government to provide “solutions as opposed to systems,” and in so doing develop better cost-benefit metrics.

2. Utah

a. Administrative Structures/Coordination Structures and Procedures

In Utah, counties have a statutory responsibility to maintain records on land ownership, to assess a fair market value on property, and to develop a land management plan for growth. Land information is collected and maintained locally by a variety of offices, including the County Assessor, City and County Auditors, County Recorder, County Clerk, County Treasurer, County Surveyor and Emergency Services [Utah Code 1999, Title 17, Chapters 17-24]. Information regarding boundary changes is transmitted to the Lt. Governor's Office for verification, after which it is sent to the Division of School and Institutional Trust Lands Administration.

Recorders are responsible for creating and updating ownership maps and plats, which are copied and transmitted to the assessor on an annual basis [Utah Code Section 17-21-21]. Assessors are responsible for inventorying and appraising all property within their jurisdiction. As part of these duties, assessors are required by statute to keep a book of ownership plats of the parcels within the county [Utah Code Section 59-2-312]. This information assists the assessor in determining a parcel's taxable situs and taxable status. Many County Assessor Offices in Utah have implemented Computer Assisted Appraisal Systems (CAAS) and/or GIS. The de facto coordinator of land information at the county level is often the County Recorder or Assessor.

Licensed surveyors are required by statute to file established geodetic control with the County Surveyor. The County Surveyor establishes and publishes geodetic control within their jurisdictions and in conjunction with the National Geodetic Survey.

Utah has several organizations that promote and coordinate statewide land records modernization efforts, principally: 1) Utah State Tax Commission; 2) Utah School and Institutional Trust Lands Administration (SITLA); 3) Utah Automated Geographic Reference Center (ARGC); 4) Utah Geographic Information Council (UGIC); 5) GIS Advisory Council (GISAC); and 6) Technical Interchange Group (TIG).

The Utah State Tax Commission administers the tax laws, collects and distributes the revenue generated from taxes, registers automobiles and regulates the automobile industry. In administering the property tax system, the Utah State Tax Commission:

- "Serves as the state board of equalization;
- Provides advice and direction to county officials;
- Approves tax rates;
- Equalizes assessments between and within counties;
- Provides technical assistance and training to counties; and
- Assesses mines, utilities and other properties as required by law."

The State Tax Commission's Property Tax Division is mandated by the Utah Constitution to assess the real and personal property of airlines, railroads, utilities,

natural resource properties, geothermal fluids and geothermal resources and other businesses whose operations cross county or state lines.²⁷⁶

The Automated Geographic Reference Center (AGRC)²⁷⁷ is located within the Division of Information Technology Services (ITS) under the Department of Administrative Services (DAS). Authorized by the 1991 Legislature, AGRC is charged with providing GIS leadership, coordination and services to federal, state, and local agencies. AGRC also is responsible for maintaining the State Geographic Information Database (SGID) and for establishing SGID standards. AGRC actively coordinates with the Utah Office of the Chief Information Officer (CIO) through the State Data Administrator to ensure an enterprise approach to GIS implementation and data development.

AGRC staffs the GIS Advisory Committee (GISAC), the Technical Interchange Group (TIG), and the Utah Geographic Information Council (UGIC). The Geographic Information Systems Advisory Council (GISAC), which leads statewide GIS data coordination efforts in Utah, is comprised of members from federal, state, and local government agencies, Indian nations and tribes, academia, and the private sector. The mission of GISAC is to "recommend GIS policy and standards, encourage GIS use and education, and promote data collection, integration and dissemination among all GIS users. Collectively, these activities promote increased productivity, better decisions, and improved services to customers".²⁷⁸ GISAC now serves as the Implementation Team for Utah. TIG, on the other hand, is an informal group that meets monthly to discuss the technical aspects of GIS.²⁷⁹

Authorized through a Concurrent Resolution of the Legislature and the Governor in 1991, the Utah Geographic Information Council (UGIC)²⁸⁰ is comprised of members from federal, state, county and municipal agencies as well as from public utilities, the private sector, non-profit organizations, and academic institutions. The purpose of the Utah Geographic Information Council is threefold:

- "To act and operate as an information and facilitating organization to promote effective development, access, application, and cooperative use of high quality and meaningful geographic information in the State of Utah among all interested agencies, institutions, companies, and individuals;
 - To promote cooperation among all levels of government and the private sector in addressing geographic-data and information needs and services in Utah;
 - To promote coordination of programs, policies, technologies, and resources to optimize opportunities and minimize duplication of effort;

²⁷⁶ Utah Property Tax Guide. 2001. August 8, 2001.
<http://tax.utah.gov/property/images/taxguide.doc>

²⁷⁷ AGRC website: <http://agrc.its.state.ut.us/>

²⁷⁸ http://agrc.its.state.ut.us/i_team/iteam_final.htm

²⁷⁹ TIG website: <http://www.utahcountyonline.org/dept/tig/>

²⁸⁰ UGIC website: <http://www.ugic.info/>

- To identify and provide recommendations to federal, state, and local agencies, and the private sector on mapping and geographic-data needs, priorities, and standards;
- To engage in any and all activities and pursuits, and to support or assist such other organizations as may reasonably be related to the foregoing and following purposes; and
- To solicit and receive contributions, purchase, own, and sell real and personal property, to make contracts, and to engage in any activity to further the goals of the Council. This may include such activities as publication of directories of geographic information groups and products, and the organization and sponsorship of an annual conference.”²⁸¹

UGIC also supports the activities of subgroups like the GPS Users Group and the state Geographic Names Board.

Utah has several regional GIS coordinating groups, including: G5 Southwest Utah Users Group; Canyon Country Partnership (CCP); Colorado Plateau Data Committee; the Uintah Basin GIS Group; and the Northern Utah Geographic Information Association. Other coordinating groups in Utah include: Utah Association of Counties; Utah League of Cities and Towns; Utah Assessor’s Association; Utah Association of Clerks/ Auditors; Utah Association of County Recorders; Utah Council of Land Surveyors; ESRI Southwest User’s Group (SWUG); Utah Metadata Discussion Group (UMETA); Utah Aerial Photo and Orthoimagery Consortium (UAPOC)²⁸²; the Utah GPS Users Group; and the Utah Geographic Names Board.²⁸³

Only 21 percent of the land in Utah is privately owned, while nearly 70 percent is owned and administered by the federal government. Major federal land owners and administrators, and hence custodians for parcel information, include the Bureau of Land Management (BLM), the US Forest Service (USFS), the Army Corps of Engineers, and the US Military. The primary state administrator of land information is the Utah Division of School and Institutional Trust Lands Administration (SITLA), which manages twelve real estate trusts encompassing nearly 3.5 million acres of surface ownership (roughly 7,500 parcels) and an additional 1 million acres of mineral-only lands; this represents seven percent of the land in Utah.²⁸⁴ Other major state administrators of land information include the Utah Department of Natural Resources, State Parks and Recreation, and the Utah Division of Water Resources. Currently, AGRC and SITLA are coordinating with all entities to collect and maintain land administration information in a central database.

b. Control Structures

1) Policies

The Geographic Information System Data Sharing and Conformity Bill, adopted by the Legislature in 1991, officially authorized the Automated Geographic

²⁸¹ UGIC website: <http://www.ugic.info/>

²⁸² <http://agrc.utah.gov/uapoc/UAPOC.htm>

²⁸³ <http://agrc.utah.gov/groups.html>

²⁸⁴ <http://www.utahtrustlands.com/about/>

Reference Center (AGRC) and the State Geographic Information Database (SGID) [Utah Code Annotated 63A-6-202 and 203]. The SGID is a comprehensive geographic database that has been made accessible through AGRC to a multitude of users. Today, the State Geographic Information Database serves as a clearinghouse for federal, state, and local data and its use is frequently specified in statute. As noted in Warnecke (2001), the GIS Data Sharing and Conformity Bill also requires that “each state agency that acquires, purchases, or produces digital geographic information data shall: (a) inform the center [AGRC] of the existence of the data layers and their geographic extent; (b) allow the center access to all data classified public; and (c) comply with any database requirements established by the center.”

State GIS policy recognizes the importance of local government involvement. Shortly after its creation under AGRC, the Geographic Information System Advisory Council (GISAC) developed the following set of policy statements, endorsed by the Legislature and the Executive branch of the State of Utah, for the coordination of GIS activities:

- “Most data should be created and kept current by agencies that have a programmatic need or mandated responsibility for specific layers.
- Because users close to the geographic features usually have first hand knowledge of the data and can provide more accurate and timely data, local governments should be encouraged to create and share data.
- Coordination of state, local and federal data development and sharing efforts should continue as a state led activity through the GIS Advisory Committee and it's partnership with the Federal Geographic Data Committee.
- There will always be a number of "framework" base layers or critical and common thematic layers (identified by GISAC) that will require funded creation and centralized maintenance. (SB21, 1991 - "GIS Data Sharing and Conformity")

The integration of differing data within and among themes should remain a centralized State Geographic Information Database function.”

In 1997, Utah Governor Michael Leavitt and multiple federal agencies²⁸⁵ signed a Memorandum of Understanding for the Utah Digital Spatial Data Sharing and Integration Project, wherein participating agencies agreed to share data in an effort to minimize duplication and to enhance intergovernmental cooperation. This agreement designated the State Geographic Information Database (SGID) Catalog as the central repository for “framework” data and named the GIS Advisory Committee as the lead coordinating body. Participating agencies agreed to provide data updates and/or links to locally-maintained catalogs and to adhere to the Federal Geographic Data Committee’s Metadata Content Standard.

²⁸⁵ Participating federal agencies included the Bureau of Land Management (BLM), US Geological Survey (USGS), US Forest Service (USFS), National Park Service (NPS), US Fish and Wildlife Service (USFWS), Natural Resources Conservation Service (NRCS), Environmental Protection Agency (EPA), US Army Corps of Engineers, US Bureau of Reclamation. The Utah Association of Soil Districts also participated.

Recognizing that many rural governments did not have the resources to implement GIS technology, the 1998 Legislature established the Utah Rural Government Geographic Information Systems Assistance Program²⁸⁶ under the 1998 Supplemental Appropriations Act II (H.B. 3, Item 40),²⁸⁷ which appropriated \$200,000 to the Automated Geographic Reference Center (AGRC) to assist rural governments with GIS implementation. Subsequent legislatures have supported this level of funding for program activities. In addition, the 1999 Legislature passed H. B. 334,²⁸⁸ which appropriated an additional \$450,000 for counties to inventory and map R.S. 2477 Rights-of-Way (ROW) and to develop GIS implementation plans. The Automated Geographic Reference Center administers program funds in cooperation with the Rural Partnership Board, the Utah Association of Counties, and the Twenty-first Century Communities Program.

The intent of the Utah Rural Government Geographic Information Systems Program is

“to afford each county the widest possible latitude in its development and implementation of the County GIS Plan. However, this intent [is] balanced by the need for the effective use of public funds for programs which are consistent with, and will ultimately contribute to, development of a statewide GIS effort.”

Currently, the Program focuses on assisting counties with the collection of survey control corner coordinate information and digital parcel mapping. The state’s role in this program is four-fold: 1) to assist rural counties in data and application development; 2) to implement appropriate data standards and methodologies; 3) to conduct training classes and workshops; and 4) to provide data integration and access through the State Geographic Information Database. In order to obtain funding, counties must participate in a one day standards and practices training session that addresses program requirements and the technical aspects of data collection.²⁸⁹

Utah also is participating in the Office of Management and Budget (OMB) and Federal Geographic Data Committee’s Implementation Team (I-Team) Initiative to develop the National Spatial Data Infrastructure (NSDI). The Utah Geographic Information Systems Advisory Council (GISAC), which has coordinated similar efforts under the Framework Demonstration Project Program (FDPP) and Competitive Cooperative Agreements Program (CCAP), serves as the Implementation Team for Utah. Subcommittee working groups under GISAC are addressing each of the eighteen framework layers and state prioritized themes listed in Table 1: Utah Framework Data Initiative Data Themes. This effort builds upon the foundation laid in 1997 with the Memorandum of Understanding for the Utah Digital Spatial Data Sharing and Integration Program.

²⁸⁶ Utah Rural Government Geographic Information Systems 2001 Assistance Program
http://agrc.utah.gov/cadastral-funding/cadast_rfp2001.htm

²⁸⁷ <http://www.le.state.ut.us/~1998/bills/hbillenr/HB0003.htm>

²⁸⁸ 1999 March 23, H.B. 334 S1 Mapping and Documentation of R.S. 2477 Rights-of-Way and Other Structures
<http://www.le.state.ut.us/~1999/htmldoc/Hbillhtm/HB0334S1.htm>

²⁸⁹ Cadastral Data Collection Program. <http://agrc.utah.gov/cadastral-funding/cadfund.html>

Table 8: Utah Framework Data Initiative Data Themes

FGDC Framework Data	Utah Priority Data Sets
Cadastral	Climate
Digital Orthoimagery	Demographics
Elevation & Bathymetry	Geology (surface and hazards)
Geodetic Control	Ground Cover
Governmental Units	Land Use
Hydrography	Soils
Transportation	Wetlands
	Wildlife Habitat

a) Geographic Reference Framework

The Public Land Survey System (PLSS) provides the spatial reference system for land ownership and title information in Utah. PLSS data in Utah is available through a number of sources, including the U.S. Geological Survey, U.S. Forest Service (USFS), Bureau of Land Management (BLM), AGRC, and other public and private contributors. Currently, both the Bureau of Land Management (BLM) and the U.S. Forest Service (USFS) have active remonumentation programs.

Approximately 7500 geodetic control stations comprise the National Spatial Reference System (NSRS) in Utah. In 1994, the National Geodetic Survey (NGS) completed the final adjustment of the Federal Base and Cooperative Base Networks (FBN/CBN). Referred to as the Utah High Accuracy Reference Network (HARN), this network is maintained by the NGS and consists of 126 stations spaced at approximately 50 kilometer (31 mile) intervals.²⁹⁰ The remaining stations are the responsibility of local entities.

Custodial responsibility for control data is shared between the NGS, Bureau of Land Management (BLM), Utah Division of School and Institutional Trust Lands Administration (SITLA), the Utah Automated Geographic Reference Center (ARGC), and county surveyors. While the NGS maintains an online database for the NSRS, ARGC is developing a clearinghouse for the distribution of geodetic data, which will serve as a central statewide source of geodetic control for local surveyors.

b) Cadastral

The Utah Cadastral Integration Project is “a collaborative effort among federal, state, and local government agencies to...integrate existing cadastral data to produce a statewide cadastral framework, establish a data management infrastructure, and make framework data available through an

²⁹⁰ Doyle, D. 2002. High Accuracy Reference Network for Utah. Observation and Analysis Division. National Geodetic Survey. http://geodesy.noaa.gov/PUBS_LIB/Utah_harn.html

enhanced National Spatial Data Clearinghouse node.” Participating organizations include the Utah Automated Geographic Reference Center, Bureau of Land Management, U.S. Forest Service, U.S. Geological Survey, Utah Division of Forestry, Fire, and State Lands, Utah Division of School and Institutional Trust Lands Administration, Utah counties, Canyon Country Partnership, Southwest Utah Planning Authorities Council, Utah Council of Land Surveyors, and the State GIS Advisory Committee. This project will focus on U.S. Public Land Survey System (PLSS)/Geographic Coordinate Data Base (GCDB) data, ownership information (agency jurisdictions and parcels), and government unit boundaries (where coincident with PLSS boundaries). Three Utah counties serve as pilot project areas for initial Cadastral plan development and implementation. ARGC will serve as the central clearinghouse and data integrator, while the BLM will continue to serve as steward of the GCDB database.

c) Digital Orthophotography

Both the U.S. Geological Survey (USGS) and the U.S. Department of Agriculture Forest Service (FS) produce standard 1-m ground resolution digital orthophoto quads (DOQ) for Utah. Through a cost sharing agreement between state, federal, and local governments, the State of Utah has acquired complete statewide DOQ coverage derived from 1997-1999 National High Altitude Aerial Photography (NAPP). Federal partners include the Bureau of Land Management (BLM), US Forest Service (USFS), National Resource Conservation Service (NRCS), Department of Interior (DOI), and US Military. Second generation coverage is planned for high growth urban areas.

d) Local Roads/Addressing

ARGC currently maintains a 1:24,000 scale digital roads coverage derived from USGS Digital Line Graph (DLG) and Forest Service Cartographic Feature File (CFF) data. While this data, which has a nominal accuracy of 20 meters, has met the traditional needs of many state and federal agencies, it is not sufficient for many county applications and in some cases is decades out of date. Recognizing the importance of a transportation data layer, the Utah Legislature provided funding that enables counties to purchase GIS and GPS equipment to inventory and map every road in their jurisdiction. Furthermore, as noted in the Framework Implementation Team Plan (2001), the Utah Association of Counties has engaged counties in a discussion about rural addressing standards for transportation. Through a cooperative effort with Blue Stakes of Utah Utility Notification Center, Inc., Utah Department of Transportation, Utah Division of Comprehensive Emergency Management, the U.S. Office of Pipeline Safety, U.S. Census Bureau, and U. S. Department of Transportation, ARGC is collecting and integrating this locally generated data to develop a high accuracy statewide road centerline database with address ranges. This database, which incorporates the Utah Transportation Data Model, will contribute to the State Geographic Information Database (SGID) and will meet the needs of several specific applications, including utility “one-call” notification, the distribution of federal transportation funds

to counties and cities, Census TIGER modernization efforts, and county parcel addressing efforts. In the future, local E911 efforts also will benefit.²⁹¹

2) Legal Framework

a) Ownership Plats and the use of GIS

17-21-21. Ownership plats -- Use of geographic information systems or computer systems.

(1) The county recorder shall prepare and keep ownership plats drawn to a convenient scale, which show the record owners of each tract of land in the county, together with the dimensions of the tract.

(2) The county recorder may not be required to:

(a) show ownership of timeshare units or timeshare estates on ownership plats; or

(b) show lot or unit ownership on subdivisions or condominium plats or other ownership plats if that information is available through computer systems or other indexes.

(3) Nothing in this chapter precludes the use of geographic information systems or computer systems by the recorder if the systems include all of the information required by this section.

Amended by Chapter 241, 2001 General Session

b) State Geographic Information Database

In 1991, the Utah Legislature adopted Senate Bill 21, Geographic Information Systems Data Sharing and Conformity, which established the Automated Geographic Reference Center (AGRC) and the State Geographic Information Database (SGID).

63A-6-203. State Geographic Information Database.

(1) There is created a State Geographic Information Database to be managed by the center.

(2) The database shall:

²⁹¹ Currently, the State of Utah is facing several issues regarding the collection and distribution of geographic data for E911. According to Bob Nagel of the Utah Automated Geographic Reference Center, Division of Information Technology, no central office is responsible for E911 data coordination, although the State Legislative Auditor has recommended the creation of such an office in Report No. 99-10. Furthermore, many E911 providers are using manual methods or tabular data with no maps; and, in general, dispatching to an emergency location does not provide routing information. Standards are needed for addressing and for geographic data utilized for emergency vehicle routing. These issues overlap with those presented by other ongoing projects and initiatives and should be taken into consideration when conducting a statewide assessment of geographic data requirements and software applications.

(a) serve as the central reference for all information contained in any GIS database by any state agency;

(b) serve as a clearing house and repository for all data layers required by multiple users; and

(c) serve as a standard format for geographic information acquired, purchased, or produced by any state agency.

(3) Each state agency that acquires, purchases, or produces digital geographic information data shall:

(a) inform the center of the existence of the data layers and their geographic extent;

(b) allow the center access to all data classified public; and

(c) comply with any database requirements established by the center.

(4) At least annually, the State Tax Commission shall deliver to the center information the State Tax Commission receives under Sections 10-1-116, 11-13-204, 11-13-205, 17-2-4, 17-2-9, 17-3-3, 17A-1-102, 17B-2-215, and 17B-4-201 relating to the creation or modification of the boundaries of the political subdivisions that are the subject of those sections.

Enacted by Chapter 212, 1993 General Session

c) Automated Geographic Reference Center

63A-6-201. Definitions.

As used in this part:

(1) "Center" means the Automated Geographic Reference Center created in Section 63A-6-202.

(2) "Database" means the State Geographic Information Database created in Section 63A-6-203.

(3) "Division" means the Division of Information Technology Services.

(4) "Geographic Information System" means a computer driven data integration and map production system that interrelates disparate layers of data to specific geographic locations.

(5) "State Geographic Information Database" means the database mandated by Section 63A-6-202.

Renumbered and Amended by Chapter 212, 1993 General Session

63A-6-202. Automated Geographic Reference Center.

(1) There is created the Automated Geographic Reference Center as part of the division.

(2) The center shall:

(a) provide geographic information system services to state agencies under rules and policies established by the division;

(b) provide geographic information system services to federal government, local political subdivisions, and private persons under rules and policies established by the division;

(c) manage the State Geographic Information Database; and

(d) establish standard format, lineage, and other requirements for the database.

(3) The division may:

(a) make rules and establish policies to govern the center and its operations; and

(b) set fees for the services provided by the center.

Enacted by Chapter 212, 1993 General Session

d) Inventory and Mapping of R.S. 2477 Rights-of-Way

72-5-304. Mapping and survey requirements.

(1) The Department of Transportation, counties, and cities are not required to possess centerline surveys for R.S. 2477 rights-of-ways.

(2) To be accepted, highways within R.S. 2477 rights-of-way do not need to be included in the plats, descriptions, and maps of county roads required by Sections 72-3-105 and 72-3-107 or on the State Geographic Information Database, created in Section 63A-6-203, required to be maintained by Subsection (3).

(3) (a) The Automated Geographic Reference Center, created in Section 63A-6-202, shall create and maintain a record of R.S. 2477 rights-of-way on the Geographic Information Database.

(b) The record of R.S. 2477 rights-of-way shall be based on information maintained by the Department of Transportation and cartographic, topographic, photographic, historical, and other data available to or maintained by the Automated Geographic Reference Center.

(c) Agencies and political subdivisions of the state may provide additional information regarding R.S. 2477 rights-of-way when information is available.

Renumbered and Amended by Chapter 270, 1998 General Session

63A-6-204. Committee to award grants to counties for inventory and mapping of R.S. 2477 rights-of-way -- Use of grants -- Request for proposals.

(1) There is created within the center a committee to award grants to counties to inventory and map R.S. 2477 rights-of-way, associated structures, and other features as provided by Subsection (5).

(2) (a) The committee shall consist of:

- (i) the center manager;
- (ii) a representative of the Governor's Office of Planning and Budget;
- (iii) a representative of Utah State University Extension;
- (iv) a representative of the Utah Association of Counties; and
- (v) three county commissioners.

(b) The committee members specified in Subsections (2)(a)(ii) through (2)(a)(iv) shall be selected by the organizations they represent.

(c) The committee members specified in Subsection (2)(a)(v) shall be:

- (i) selected by the Utah Association of Counties;
- (ii) from rural counties; and
- (iii) from different regions of the state.

(3) (a) The committee shall select a chair from its membership.

(b) The committee shall meet upon the call of the chair or a majority of the committee members.

(c) Four members shall constitute a quorum.

(4) (a) Committee members who are state government employees shall receive no additional compensation for their work on the committee.

(b) Committee members who are not state government employees shall receive no compensation or expenses from the state for their work on the committee.

(5) (a) The committee shall award grants to counties to:

(i) inventory and map R.S. 2477 rights-of-way using Global Positioning System (GPS) technology; and

(ii) photograph:

(A) roads and other evidence of construction of R.S. 2477 rights-of-way;

(B) structures or natural features that may be indicative of the purpose for which an R.S. 2477 right-of-way was created, such as mines, agricultural facilities, recreational facilities, or scenic overlooks; and

(C) evidence of valid and existing rights on federal lands, such as mines and agricultural facilities.

(b) (i) The committee may allow counties, while they are conducting the activities described in Subsection (5)(a), to use grant monies to inventory, map, or photograph other natural or cultural resources.

- (ii) Activities funded under Subsection (5)(b)(i) must be integrated with existing programs underway by state agencies, counties, or institutions of higher education.
 - (c) Maps and other data acquired through the grants shall become a part of the State Geographic Information Database.
 - (d) Counties shall provide an opportunity to interested parties to submit information relative to the mapping and photographing of R.S. 2477 rights-of-way and other structures as provided in Subsections (5)(a) and (5)(b).
- (6) (a) The committee shall develop a request for proposals process and issue a request for proposals.
- (b) The request for proposals shall require each grant applicant to submit an implementation plan and identify any monetary or in-kind contributions from the county.
 - (c) In awarding grants, the committee shall give priority to proposals to inventory, map, and photograph R.S. 2477 rights-of-way and other structures as specified in Subsection (5)(a) which are located on federal lands that:
 - (i) a federal land management agency proposes for special management, such as lands to be managed as an area of critical environmental concern or primitive area; or
 - (ii) are proposed to receive a special designation by Congress, such as lands to be designated as wilderness or a national conservation area.

Enacted by Chapter 375, 1999 General Session

e) 911 and Compliance with State Geographic Information Database

53-10-503. Utah 911 Committee.

- (1) There is created within the bureau the Utah 911 Committee, consisting of up to nine members who are knowledgeable about public safety communications and the networking of communications systems, to be appointed as follows:
- (a) two members appointed by the commissioner of public safety;
 - (b) one member appointed by the Utah Chiefs of Police Association;
 - (c) one member appointed by the Utah Sheriffs Association;
 - (d) one member appointed by the Utah Fire Chiefs Association;
 - (e) one member appointed by the speaker of the House of Representatives; and
 - (f) up to three additional members appointed by the committee members listed in Subsections (1)(a) through (e).
- (2) The Utah 911 Committee created in Subsection (1) shall make recommendations to the Law Enforcement and Criminal Justice Interim Committee not later than the November 2002 interim meeting regarding:

- (a) the appropriate uses of 911 funds;
- (b) whether 911 fees should fund a consistent level of service statewide;
- (c) the centralization of the collection of the 911 fee under the State Tax Commission;
- (d) necessary geographic data standards compliant with the State Geographic Information Database, created in Section 63a-6-203, for location of an emergency and response routing;
- (e) the integration of wireless technology into the 911 system; and
- (f) *plans for a statewide 911 system and provisions for technical assistance, including geographic data standards compliant with the State Geographic Information Database, created in Section 63a-6-203, and coordination to Public Safety Answering Points.*

Enacted by Chapter 269, 2002 General Session

f) Voting Precincts

20A-5-303. Establishing, dividing, abolishing, and changing voting precincts -
- Common polling places -- Combined voting precincts -- Counties.

- (1) (a) The county legislative body may establish, divide, abolish, and change voting precincts.
 - (b) Within 30 days after the establishment, division, abolition, or change of a voting precinct under this section, the county legislative body shall file with the Automated Geographic Reference Center, created under Section 63A-6-202, a notice describing the action taken and specifying the resulting boundaries of each voting precinct affected by the action.
- (2) (a) The county legislative body shall alter or divide voting precincts so that each voting precinct contains not more than 1,000 active voters.
 - (b) The county legislative body shall:
 - (i) identify those precincts that may reach 1,000 active voters or become too large to facilitate the election process; and
 - (ii) divide those precincts before February 1.
- (3) The county legislative body may not:
 - (a) establish or abolish any voting precinct after February 1, of a regular general election year; or
 - (b) alter or change the boundaries of any voting precinct after February 1, of a regular general election year.
- (4) For the purpose of balloting on regular primary or regular general election day, the county legislative body may establish a common polling

place for two or more whole voting precincts according to the following requirements:

- (a) the total population of the voters authorized to vote at the common polling place may not exceed 3,000 active voters;
 - (b) the voting precincts voting at the common polling place shall all lie within the same legislative district; and
 - (c) the voting precincts voting at, and the location of, the common polling place shall be designated at least 90 days before the election.
- (5) In addition to the authorizations contained in Subsection (4), in regular primary elections only, the county legislative body may combine voting precincts and use one set of election judges for the combined precincts if the ballots for each of the combined precincts are identical.

Amended by Chapter 225, 2002 General Session

3) Funding and Costs

The Utah Automated Geographic Reference Center (ARGC) is funded in part through legislative appropriation, which covers coordination activities, and in part through an internal service fund. The 2003 Appropriations Bill (H.B. 1) allocated \$371,500 from the General Fund, \$302,800 from the General Fund, One-time, and \$351,500 from Dedicated Credits Revenue to support AGRC activities. ARGC also receives grants for cooperative projects with state and local agencies. It also pools funds with Bureau of Land Management, Forest Service, and other federal agencies on cooperative projects.

The Utah Legislature appropriated \$200,000 for the Rural Government Geographic Information Systems Assistance Program in 1998, 2000, and 2001. In addition, the 1999 Legislature appropriated \$450,000 for counties to inventory and map R.S. 2477 Rights-of-Way (ROW) and to develop GIS implementation plans.

Average yearly costs for framework data development is \$300,000. Estimated costs for framework and priority GIS data layer development as laid out in the Utah Framework Implementation Team Plan 2001 are as follows:²⁹²

- *Cadastral*: The estimated cost for cadastral mapping over the next ten years is \$5,600,000, with \$500,000 required in the first year. This figure does not include the ongoing maintenance costs necessary to keep the cadastral layer current.
- *Geodetic Control*: It is estimated that approximately 700 stations will need to be established at roughly \$7000 per station for a total cost of \$4,900,000.
- *Digital Orthophotography*: A second generation of Digital Orthophoto Quads (DOQs) is planned at least for high growth areas at a cost of \$800 per quarter quad for a total cost of \$803,200. To create new DOQs on a

²⁹² Utah GIS Advisory Committee. 2001. Utah Framework Implementation Team Plan 2001. April 16, 2001.
http://agrc.utah.gov/i_team/i-team.htm

statewide basis (1540 quads) would cost approximately \$4,928,000 over a ten year cycle.

- *Transportation:* It is estimated that to finish GPSing and attributing 50,000 miles of roads in Utah would cost approximately \$100/mile or \$5,000,000 in total.

4) Standards

In an effort to facilitate data sharing, the five regional GIS coordinating groups, in cooperation with ARGC, have developed “Share Code Standards,” which standardize the attributes of various geographic databases, such as Cadastral, Transportation, Hydrology, and Vegetation.²⁹³ While compliance is voluntary, GISAC, ARGC and others are actively building consensus and promoting local adoption of the share codes.

In addition, the GISAC and the State of Utah have adopted the FGDC metadata standard as the standard for the State Geographic Information Database. FGDC standards, in general, serve as *de facto* standards for the framework themes and priority data layers.

The Utah State Tax Commission Property Tax Division has developed a set of Mapping and Parcel Identification Standards, which clarify the procedures of property identification and mapping for ad valorem taxation purposes:²⁹⁴

- Standard 8.1 requires that county mapping systems for ad valorem tax purposes must include the following three components: ownership plats; city or county index systems; subdivision index. This standard also specifies the minimum required plat content and design elements and permits the use of geographic information systems.
- Standard 8.2 requires that each parcel be assigned a unique identification number or code. These parcel identification numbers (PIN) must be used to organize and file all tax maps, property record cards, assessment and tax rolls, the notice of valuation and tax change, the property tax notice, and other property tax and land records. Three kinds of numbering systems are permitted: 1) Map-base or book-page system; 2) Government Survey; and 3) Geographic Coordinate Code (Geocode).
- Standard 8.3 grants responsibility for assigning parcel identification numbers to the county recorder, who is required to maintain a complete and accurate record of all information necessary to assign appropriate numbers, such as abstract, ownership, tax entities, tax areas and individual parcel legal description.

²⁹³ GIS Standards: <http://agrc.utah.gov/standards/stds.html>

²⁹⁴ Utah State Tax Commission, Property Tax Division Mapping and Parcel Identification Standards (2001): <http://tax.utah.gov/property/standards/Standard08/index08.htm> ;
Property Tax Standards of Practice: <http://tax.utah.gov/property/standards/index.html>

c. Issues and Opportunities

Technical impediments to land records modernization have been few, but trained personnel are needed. Institutional impediments, on the other hand, have been more significant. Providing funding to counties does not ensure success. Funding is limited, and existing funds at times have been diverted locally to other immediate needs. Efforts to pass legislation that would institute an additional recordation fee to support land records modernization efforts have been stymied, as have efforts to pass legislation that would impose a user fee for wireless service to fund relevant GIS and addressing activities. In the future, efforts will focus on continuing to educate local and state policy makers as to the importance of GIS and land records modernization. Existing local support will be bolstered with more outreach activities, including training, greater opportunities for participation, and pass-through funding wherever possible.

Appendix A: State Participants

The following table lists participants who were interviewed by phone. Follow-up emails and/or phone calls also may have been conducted for clarification on information gathered.

Table 9: State Participants

STATE	CONTACT	AGENCY
INDIANA	Roger Koelpin	State GIS Coordinator, Indiana Information Technology Oversight Commission
KANSAS	Rick Miller	State GIS Director, Kansas Information Technology Office
	Ivan Weichert	State GIS Coordinator, Kansas Information Technology Office
	Susan Williams	Cartography/GIS, Property Valuation Division, Kansas Department of Revenue
MINNESOTA	David Arbeit	Director, Minnesota Land Management Information Center, Minnesota Planning
MONTANA	Stu Kirkpatrick	Chief, GIS Services Bureau, Information Technology Services Division, Montana Department of Administration
OREGON	Cy Smith	Statewide GIS Coordinator, Information Resources Management Division, Oregon Department of Administrative Services
TENNESSEE	Mark Tuttle	Director, GIS Services Division, State of Tennessee
UTAH	Bob Nagel	Automated Geographic Reference Center, Utah Division of Information Technology
VIRGINIA	William Shinar	Coordinator, Virginia Geographic Information Network Division, Department of Technology Planning, Office of the Secretary of Technology
	J. Jack Kennedy, Jr.	Wise County Clerk of Circuit Court, Wise County; VGIN Advisory Board Member; former Virginia Land Records Management Task Force Member
WISCONSIN	Steve Ventura	University of Wisconsin-Madison, and Former WLIA President
	Jerry Sullivan	GIS Services Center, Office of Land Information Systems, Wisconsin Department of Administration

Appendix B: Selected Oregon Statutes Relating to Land Information

ORS 672.005(2) Additional definitions.²⁹⁵

As used in ORS 672.325 to 672.325, unless the context requires otherwise:

(1)(a) "Practice of engineering" or "practice of professional engineering" means: (A) Any professional service or creative work requiring engineering education, training and experience; and (B) The application of special knowledge of the mathematical, physical and engineering sciences to such professional services or creative work as consultation, investigation, testimony, evaluation, planning, design and services during construction, manufacture or fabrication for the purpose of ensuring compliance with specifications and design, in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works or projects.

(b) "Practice of engineering" or "practice of professional engineering" may include: (A) Surveying to determine area or topography; (B) Surveying to establish lines, grades or elevations, or to determine or estimate quantities of materials required, removed or in place; or (C) Surveying required for design and construction layout of engineering and architectural infrastructure.

(2) "Practice of land surveying" means that branch of the practice of engineering in which: (a) Surveys are made to determine area or topography, to establish or reestablish land boundaries, corners or monuments or to subdivide or plat land; (b) Surveys are made to establish lines, grades or elevations, or to determine or estimate quantities of materials required, removed or in place; (c) Surveys are made for horizontal or vertical mapping control or geodetic control; or (d) Consultation, investigation, evaluation or planning relating to land surveying matters is required.

ORS 672.045: Prohibited activities relating to practices of engineering and land surveying.

A person shall not: (1) Engage in the practice of engineering or land surveying without having a valid certificate or permit to so practice issued in accordance with ORS 672.002 to 672.325.

672.060 Exceptions to application of ORS 672.002 to 672.325.

ORS 672.002 to 672.325 do not apply to:

(1) Any registered architect practicing architecture.

(2) Any registered sanitarian or registered sanitarian trainee working under the supervision of a registered sanitarian practicing environmental sanitation, or any registered waste water sanitarian or registered waste water sanitarian trainee working under the supervision of a registered waste water sanitarian practicing waste water sanitation.

(3) Any person working as an employee or a subordinate of a registered professional engineer if:

(a) The work of the person does not include final engineering designs or decisions;

²⁹⁵ <http://www.gis.state.or.us/coord/survey/SurveyDefinitions.pdf>

- (b) The work of the person is done under the supervision and control of and is verified by a registered professional engineer; and
 - (c) The person does not purport to be an engineer or registered professional engineer by any verbal claim, sign, advertisement, letterhead, card or title.
- (4) Any person practicing land surveying under the supervision of a registered professional land surveyor or registered professional engineer. The exemption in this subsection does not allow an engineer to supervise any land surveying activity the engineer could not personally perform under ORS 672.025.
- (5) An individual, firm, partnership or corporation practicing engineering or land surveying:
 - (a) On property owned or leased by the individual, firm, partnership or corporation, or on property in which the individual, firm, partnership or corporation has an interest, estate or possessory right; and
 - (b) Which affects exclusively the property or interests of the individual, firm, partnership or corporation, unless the safety or health of the public, including employees and visitors, is involved."
- (6) The performance of engineering work by any person, firm or corporation, or by full-time employees of any of them, provided:
 - (a) The work is in connection with or incidental to the operations of such persons, firms or corporations; and
 - (b) The engineering work is not offered directly to the public.
- (7) A person executing engineering work designed by a professional engineer or supervising the construction of such work as a foreman or superintendent.
- (8) A landowner performing land surveying within the boundaries of the landowner's land or the landowner's regular employee performing land surveying services as part of the employee's official duties within the boundaries of the land of the employer.
- (9) An individual, firm, partnership or corporation offering to practice engineering or land surveying if:
 - (a) The individual, firm, partnership or corporation holds a certificate of registration to engage in the practice of professional engineering or land surveying issued by the proper authority of any other state, a territory or possession of the United States, or a foreign country; and
 - (b) The offer includes a written statement that the offeror is not registered to practice engineering or land surveying in the State of Oregon, but will comply with ORS 672.002 to 672.325 by having a person holding a valid certificate of registration in this state in responsible charge of the work prior to performing any engineering or land surveying work within this state.
- (10) A person making plans or specifications for, or supervising the erection, enlargement or alteration of, a building, or any appurtenance thereto, if the building is to be used for a

single family residential dwelling or farm building or is a structure used in connection with or auxiliary to a single family residential dwelling or farm building, including but not limited to a three-car garage, barn, shed or shelter used for the housing of domestic animals or livestock. Nothing in ORS 672.002 to 672.325 shall prevent any person from making plans or specifications for, or supervising the erection, enlargement or alteration of, any building, or any appurtenance thereto, where the building has a ground area of 4,000 square feet or less and is not more than 20 feet in height from the top surface of lowest flooring to the highest interior overhead finish of the structure. [Amended by 1971 c.751 s.4; 1981 c.143 s.4; 1981 c.159 s.2; 1983 c.614 s.2; 1995 c.572 s.22; 1997 c.210 s.5; 1999 c.830 s.1] 820-010-0010

Definitions: The following definitions and guides have been adopted by the Board to assist registrants and the general public in their interpretation of specific portions of ORS 672.002 to 672.325.

(6) "Practice of land surveying" refers to ORS 672.005(3) and 672.007. It is interpreted by the Board as the application of all technologies for quantitative measurement of the earth surface, sub-surface, and sub-oceanic features for the purpose of, but not limited to, location and relocation of boundaries, construction of maps, and the determination of positions, elevations, areas, and volumes. The practice requires fundamental knowledge of mathematics and science as applied to instrumentation, observations, and measurements and the rigid adjustments of data to useful and practical mapping and survey systems. The practice also requires authoritative knowledge of common law in boundary locations particularly with regard to unwritten title transfer and admissible evidence, as well as the current statutory laws in the State of Oregon with respect to land subdivision and the legal responsibilities of a land surveyor.

Boundary, Land - A line of demarcation between adjoining parcels of land. The parcels of land may be of the same or of different ownership, but distinguished at some time in the history of their descent by separate legal descriptions. A land boundary may be marked on the ground by material monuments placed primarily for the purpose; by fences, hedges, ditches, roads, and other service structures along the line - or defined by astronomically described points and lines; by coordinates on a survey system whose position on the ground is witnessed by material monuments which are established without reference to the boundary line; by reference to adjoining present or previous owners; and by various other methods.
(ACSM definition)

92.010 Definitions for ORS 92.010 to 92.190. As used in ORS 92.010 to 92.190, unless the context requires otherwise:

- (10) "Property line" means the division line between two units of land.
- (11) "Property line adjustment" means the relocation of a common property line between two abutting properties.

Appendix C: 70th Oregon Legislative Assembly - 1999 Regular Session, House Bill 2139

House Bill 2139

AN ACT

Relating to tax administration funding; creating new provisions; amending ORS 306.815, 311.505 and 311.508 and sections 6, 15 and 23, chapter 796, Oregon Laws 1989; repealing ORS 311.500; and appropriating money.

Be It Enacted by the People of the State of Oregon:

SECTION 1. ORS 311.505 is amended to read:

311.505. (1) Except as provided in subsection (6) of this section, the first one-third of all taxes and other charges due from the taxpayer or property, levied or imposed and charged on the latest tax roll, shall be paid on or before November 15, the second one-third on or before February 15, and the remaining one-third on or before May 15 next following.

(2) Interest shall be charged and collected on any taxes on property, other charges, and on any additional taxes or penalty imposed for disqualification of property for special assessment or exemption, or installment thereof not paid when due, at the rate of one { + and one-third + } percent per month, or fraction of a month until paid.

(3) Discounts shall be allowed on partial or full payments of such taxes, made on or before November 15 as follows:

(a) Two percent on two-thirds of such taxes so paid.

(b) Three percent where all of such taxes are so paid.

(4) For purposes of this section, 'taxes' includes all taxes on property as defined in ORS 310.140 and certified to the assessor under ORS 310.060 except taxes assessed on any other property which have by any means become a lien against the property for which the payment was made.

(5) All interest collected and all discounts allowed shall be prorated to the several municipal corporations, taxing districts and governmental agencies sharing in the taxes or assessments.

(6) If the total property tax is less than \$40, no installment payment of taxes shall be allowed.

SECTION 2. ORS 311.508 is amended to read:

311.508. (1) Except as provided under subsection (2) of this section and notwithstanding ORS 311.505 (5):

(a) Twenty-five percent of the interest charged and collected under ORS 311.505 { - for periods beginning on or after July 1, 1989, - } shall be deposited and credited to the County Assessment and Taxation Fund created under section 7, chapter 796, Oregon Laws 1989; and

(b) An additional 25 percent of the interest charged and collected under ORS 311.505 shall be deposited and credited to

the County Assessment and Taxation Fund created under section 7, chapter 796, Oregon Laws 1989, to the extent the interest would otherwise be distributed to cities or other taxing districts that are not counties or districts within the public school system.

(2) On or before { - June 15, 1990, and on or before each - } June 15 of each year { - thereafter - }, the Department of Revenue shall estimate the amount of interest that will be deposited and credited to the County Assessment Function Funding Assistance Account created under section 6, chapter 796, Oregon Laws 1989, for the ensuing fiscal year. If the estimate is less than \$13 million, the department shall certify to each county treasurer an increase in the percentage specified under subsection (1)(a) of this section to the end that the estimate reaches \$13 million. However, no increase in percentage shall be certified that will raise and make available for deposit and credit to the County Assessment Function Funding Assistance Account for the ensuing fiscal year an amount that is in excess of \$3 million over the amount estimated under this subsection to be received under subsection (1)(a) of this section for the ensuing fiscal year.

(3) Upon receipt of certification from the department under subsection (2) of this section, the county treasurer shall deposit and credit to the County Assessment and Taxation Fund for the fiscal year to which the certification applies the percentage of the interest charged and collected under ORS 311.505 so certified.

(4) The percentage of the interest on unpaid taxes and penalties required to be deposited and credited to the County Assessment and Taxation Fund under this section shall be deposited and credited in the same manner that the remaining interest is deposited and credited under ORS 311.385.

SECTION 2a. Section 6, chapter 796, Oregon Laws 1989, is amended to read:

{ + Sec. 6. + } (1) There is created under ORS 293.445 a suspense account to be known as the County Assessment Function Funding Assistance Account. The account shall consist of:

(a) All moneys paid over by the county treasurers as provided under section 7 { - of this 1989 Act - } { + , chapter 796, Oregon Laws 1989 + }; and

(b) All interest earned upon any moneys in the account.

(2) Of the moneys in the account as of the last day of each fiscal quarter, { - 10 percent - } { + the moneys necessary to pay the following Department of Revenue expenses + } shall be transferred to a suspense account of the department created under ORS 293.445 and

{ - is - } { + are + } continuously appropriated to the department for { - the following - } :

(a) { - To carry - } { + Expenses incurred in carrying + } out the purposes of sections 2 to 6 { - of this 1989 Act. - } { + , chapter 796, Oregon Laws 1989; and + }

(b) Appraisal { + expenses incurred + } by the department { - of - } { + in appraising + } secondary industrial properties identified under ORS 306.126. { + }

(3) The total amount of moneys transferred to the suspense account of the department under subsection (2) of this section may not exceed 10 percent of the moneys in the account as of the last day of the fiscal quarter for which the transfer is being

made. + }

{ - (3) - } { + (4) + } The remainder of the moneys in the account as of the last day of the fiscal quarter shall be used for the purpose of making the grant payments to counties as required under section 3 { - of this 1989 Act - } { + , chapter 796, Oregon Laws 1989, + } and are continuously appropriated to the department for that purpose.

SECTION 2b. { + The amendments to section 6, chapter 796, Oregon Laws 1989, by section 2a of this 1999 Act apply to County Assessment Function Funding Assistance Account transfers occurring on or after January 1, 2000. + }

SECTION 3. Section 15, chapter 796, Oregon Laws 1989, is amended to read:

{ + Sec. 15. + } (1) Notwithstanding ORS 205.320, and in addition to and not in lieu of the fees charged and collected under ORS 205.320 and other fees, { - a fee of \$20 - } { + the following fees + } shall be charged and collected for the recording or filing of any instrument { - conveying or contracting to convey any estate or interest in real property or any trust or power concerning real property. - } { + described in ORS 205.130:

(a) A fee of \$1, to be credited as provided in subsection (3)(a) of this section; and

(b) A fee of \$10, to be credited as provided in subsection (3)(b) of this section. + }

(2) Subsection (1) of this section does not apply to the recording or filing of the following:

{ + (a) Evidence of authority to solemnize marriages under ORS chapter 106;

(b) Instruments that are otherwise exempt from recording or filing fees under any provision of law; or

(c) Internal county government instruments not otherwise charged a recording or filing fee. + }

{ - (a) Instruments required to be recorded or filed in the records of mortgages or as provided under ORS 93.780 to 93.800. - }

{ - (b) Instruments required to be recorded or filed in the records of statutory liens or in the County Clerk Lien Record described in ORS 205.130 (3)(c). - }

{ - (c) Instruments described in ORS 205.246. - }

{ - (d) Release, limitation or restriction of any power of appointment as described under ORS 93.220. - }

{ - (e) Instruments for the filing or recording of which no fee is charged under ORS 205.320, including but not limited to those instruments described in ORS 93.690 and 205.400, or an instrument that conveys or contracts to convey a license or an easement to this state or to a political subdivision of this state, or to a public utility. As used in this paragraph, 'public utility' means any governmental or business entity that owns or operates any plant, equipment, property, franchise or license for the transmission of communications (including but not limited to telecommunications and televisions), or the production, transmission, sale, delivery or furnishing of electricity, gas, water or steam, and whose rates of charges for goods or services have been established or approved by a federal, state or local government or governmental agency. 'Public utility' does not

include a governmental or business entity that owns or operates any plant, equipment, property, franchise or license for the transportation of goods or services, including but not limited to motor, bus, air, rail or street rail. - }

{ - (f) Death certificates recorded under ORS 205.130 and decrees of distribution filed in connection with an estate proceeding. - }

{ - (g) Plats or vacations of plats recorded under ORS 92.100 or 271.230. - }

{ - (h) Earnest money, preliminary sales agreement, options, rights of first refusal, profit a prendre and interests in timber. - }

{ - (3) Except as provided under subsection (2) of this section, Subsection (1) of this section does apply to the recording or filing of the following: - }

{ - (a) Instruments conveying an interest in real property required to be recorded in the records of deeds. - }

{ - (b) Instruments contracting to convey title to any real property, or memorandum thereof. - }

{ - (c) An instrument creating a license, easement, a leasehold interest, an oil, gas or other mineral estate. - }

{ - (d) A certified copy of a deed or patent issued in accordance with ORS 93.230. - }

{ - (e) An assignment of sheriff's certificate of sale of real property on execution or mortgage foreclosure as described in ORS 93.530. - }

{ - (f) Instruments filed or recorded under the following, if they create or convey an interest in real property as described under paragraphs (a) to (e) of this subsection: ORS 93.730, 93.760, or 93.770. - }

{ - (g) Instruments described under paragraph (a) to (f) of this subsection executed by a personal representative or any decree of distribution vesting title to real property filed under ORS 116.223. - }

{ - (4) The Department of Revenue may adopt rules consistent with subsections (1) to (3) of this section that further describe the instruments for which the additional fee charged under subsection (1) of this section for recording and filing shall be charged and collected. - }

{ - (5) - } { + (3) + } Of the amounts charged and collected under this section { - , five percent shall be charged and collected for the benefit of the county. The remaining 95 percent shall be deposited and credited - } { + :

(a) The recording or filing fee charged and collected under subsection (1)(a) of this section shall be deposited and credited to the Oregon Land Information System Fund established under section 7 of this 1999 Act; and

(b) Of the recording or filing fee charged and collected under subsection (1)(b) of this section, five percent shall be credited for the benefit of the county and 95 percent shall be deposited and credited + } to the County Assessment and Taxation Fund created under section 7 { + , chapter 796, Oregon Laws 1989 + } { - of this 1989 Act - } .

SECTION 4. Section 23, chapter 796, Oregon Laws 1989, as amended by section 6, chapter 782, Oregon Laws 1997, is amended to read:

{ + Sec. 23. + } Section 15, chapter 796, Oregon Laws 1989, applies to instruments filed or recorded on or after January 1, 1990 { - , and before July 1, 2000 - } .

SECTION 5. { + The amendments to section 15, chapter 796, Oregon Laws 1989, by section 3 of this 1999 Act apply to instruments recorded or filed on or after January 1, 2000. + }

SECTION 6. ORS 306.815 is amended to read:

306.815. (1) A city, county, district or other political subdivision or municipal corporation of this state shall not impose, by ordinance or other law, a tax or fee upon the transfer of a fee estate in real property, or measured by the consideration paid or received upon transfer of a fee estate in real property.

(2) A tax or fee upon the transfer of a fee estate in real property does not include any fee or charge that becomes due or payable at the time of transfer of a fee estate in real property, unless that fee or charge is imposed upon the right, privilege or act of transferring title to real property.

(3) Subsection (1) of this section does not apply to any fee established under ORS 203.148.

(4) Subsection (1) of this section does not apply to any tax if the ordinance or other law imposing the tax is in effect and operative on March 31, 1997.

(5) Subsection (1) of this section does not apply to any tax { - if the ordinance or other law imposing the tax first becomes effective or operative on or after July 1, 2000 - } { + or fee that is imposed upon the transfer of a fee estate in real property if the fee that is imposed under section 15, chapter 796, Oregon Laws 1989, for the recording or filing of the instrument conveying the real property being transferred is less than \$11 + }.

SECTION 7. { + (1) The Oregon Land Information System Fund is created, separate and distinct from the General Fund.

(2) Moneys in the Oregon Land Information System Fund are continuously appropriated to the Department of Revenue for the purpose of funding a base map system to be used in administering the ad valorem property tax system. + }

SECTION 8. { + (1) The Department of Revenue shall develop a base map system to facilitate and improve the administration of the ad valorem property tax system.

(2) In developing the base map system, the department shall be advised by an advisory committee that is hereby created and that shall be known as the Oregon Land Information System Advisory Committee. The advisory committee shall advise the department concerning the administrative and public needs related to the development of the base map system.

(3) The advisory committee shall consist of individuals appointed to the committee by the Director of the Department of Revenue. + }

SECTION 9. { + (1) The Department of Revenue, in consultation with the county governing bodies and the county assessors of this state, shall conduct a study of the appropriate level of funding for property assessment and taxation functions, and funding sources for property tax administration. In addition to a general review of the appropriate level of funding for property

assessment and taxation functions, the study shall consider whether the level of funding in effect following enactment of this 1999 Act:

- (a) Promotes stable tax administration and the development of high quality property appraisal data and mapping;
 - (b) Is sufficient to allow county assessors and the department to meet the service expectations of private sector users of property appraisal data and mapping; and
 - (c) Results in an appropriate sharing of costs between public and private sector users of property appraisal data and mapping.
- (2) The study shall also consider various means to improve cost efficiency in the property assessment process including, but not

Enrolled House Bill 2139 (HB 2139-A)

Page 5

limited to, consideration of the extent to which efficiency is improved through department assessment of property instead of county assessment of property.

(3) The department shall report the findings of the study to those interim committees of the Seventy-second Legislative Assembly having jurisdiction over property tax matters no later than December 31, 2004. + }

SECTION 10. { + ORS 311.500 is repealed on January 1, 2000. + }

Passed by House March 30, 1999

.....
Chief Clerk of House
.....
Speaker of House

Passed by Senate June 7, 1999

Appendix D: Virginia Acts of Assembly - 2002 Session

CHAPTER 637

An Act to amend and reenact § 17.1-279 of the Code of Virginia, relating to information technology fee.

[H 675]

Approved April 6, 2002

Be it enacted by the General Assembly of Virginia:

1. That § 17.1-279 of the Code of Virginia is amended and reenacted as follows:

§ 17.1-279. Additional fee to be assessed by circuit court clerks for information technology.

A. In addition to the fees otherwise authorized by this chapter, the clerk of each circuit court shall assess a three-dollar fee, known as the "Technology Trust Fund Fee," in each law and chancery action, upon each instrument to be recorded in the deed books, and upon each judgment to be docketed in the judgment lien docket book. Such fee shall be deposited by the State Treasurer into a trust fund. The State Treasurer shall maintain a record of such deposits.

B. Two dollars of every three-dollar fee shall be allocated by the Compensation Board from the trust fund for the purposes of: (i) obtaining office automation and information technology equipment, including software and conversion services; (ii) preserving, maintaining and enhancing court records, including, but not limited to, the costs of repairs, maintenance, service contracts and system upgrades which may include, but not necessarily be limited to, a digital imaging system; and (iii) improving public access to court records. The Compensation Board in consultation with the circuit court clerks and other users of court records shall develop policies governing the allocation of funds for these purposes. In allocating funds, the Compensation Board may consider the current automation of the clerks' offices and the recommendations made in the 1996 report by the Joint Legislative Audit and Review Commission (JLARC) regarding automation of the circuit court clerks' offices. Except for improvements as provided in subsection E, such policies shall require a clerk to submit to the Compensation Board a written certification from the Department of Technology Planning that the clerk's proposed technology improvements will be compatible with a system to provide statewide remote access to land records in accordance with the recommendations of JLARC and the Task Force on Land Records Management (the Task Force) established by the Department of Technology Planning.

The annual budget submitted by each circuit court clerk pursuant to § 15.2-1636.7 may include a request for technology improvements in the upcoming fiscal year to be allocated by the Compensation Board from the trust fund. Such request shall not exceed the deposits into the trust fund credited to that locality. The Compensation Board shall allocate the funds requested by the clerks in an amount not to exceed the deposits into the trust fund credited to their respective localities.

C. The remaining one dollar of each such fee may be allocated by the Compensation Board from the trust fund for the purposes of (i) funding studies to develop and update individual land-records automation plans for individual circuit court clerks' offices and (ii) implementing the plan to modernize land records in individual circuit court clerk's offices and provide remote access to land records throughout the Commonwealth.

D. Such fee shall not be assessed to any instrument to be recorded in the deed books nor any judgment to be docketed in the judgment lien docket books tendered by any federal, state or local government.

E. Notwithstanding any other provisions of this chapter, each circuit court clerk may apply to the Compensation Board for an allocation from the Technology Trust Fund for automation and technology improvements for any one or more of the following: (i) equipment and services to convert paper, microfilm, or similar documents to a digital image format, (ii) the conversion of information into a format which will accommodate remote access, and (iii) the law and chancery division of his office. However, allocations for (iii) above shall not exceed the pro rata share of the collections of the three-dollar fee relative to the chancery and law actions filed in the jurisdiction as provided in this section. *If a clerk has implemented the technology plan approved by the Department of Technology Planning referred to in subsection B, and such plan has been amended to reflect the clerk's 2 automation progress and has been submitted to the Department of Technology Planning at least biennially beginning July 1, 2002, the Compensation Board may approve an application for an allocation that exceeds the pro rata share of collections of the three-dollar fee relative to the chancery and law actions filed in that jurisdiction. The Compensation Board in approval of such application shall consider what local funds have been spent by the jurisdiction to accelerate the implementation of the technology plan approved by the Department of Technology Planning.*

F. Information regarding the technology programs adopted by the circuit court clerks shall be shared with the Department of Information Technology, The Library of Virginia, and the Office of the Executive Secretary of the Supreme Court.

G. Nothing in this section shall be construed to diminish the duty of local governing bodies to furnish supplies and equipment to the clerks of the circuit courts pursuant to § 15.2-1656. Revenue raised as a result of this section shall in no way supplant current funding to circuit court clerks' offices by local governing bodies.

H. The provisions of this section shall expire on July 1, 2002 2004.

Appendix E: Wisconsin Statutes Applicable to the Land Information Program

Source: http://www.doa.state.wi.us/dhir/documents/WLIP_statutes_applicable.pdf

See also Chapter Adm 47 Wisconsin Administrative Code: Wisconsin Land Information Program Grants-In-Aide to Local Government: http://folio.legis.state.wi.us/cgi-bin/om_isapi.dll?clientID=93450&infobase=code.nfo&jump=ch.%20Adm%2047

STATUTES RELATED TO WISCONSIN LAND INFORMATION BOARD

15.105 (16) Land Information Board.

(a) **Creation.** There is created a land information board attached to the department of administration under s. 15.03.

(b) **Members.** The board consists of the following members:

1. The secretary of administration, the secretary of agriculture, trade and consumer protection, the secretary of natural resources, the secretary of revenue and the secretary of transportation, or their designees.
2. Four representatives from county and municipal government selected from various geographical regions of the state, including at least one member of a county board of supervisors, at least one member of a city council, village board or town board and at least one person who is a county officer active in land information management, to serve 6-year terms.
3. Four representatives chosen from public utilities and private businesses selected from various geographical regions of the state, including at least one public utility representative and at least one representative of a professional land information organization, to serve 6-year terms.
4. The state cartographer.
5. One member nominated to the governor by a statewide association whose purposes include support of a network of statewide land information systems.

(c) **Advisory members.** The state historic preservation officer and the state geologist, or their designees, a representative of a regional planning commission who is selected by the board, a county employee active in land management who is selected by the board, and representatives of state and federal agencies active in land information management who are selected by the board, shall serve as nonvoting, advisory members of the board.

NOTE: Sub. (16) is repealed effective September 1, 2003 by 1997 Wisconsin Act 27. 1997 Wisconsin Act 27 - Section 9101. Non statutory provisions; administration.

(11m) **REPORT BY LAND INFORMATION BOARD AND WISCONSIN LAND COUNCIL.** No later than September 1, 2002, the land information board and Wisconsin land council shall report to the legislature in the manner provided under section 13.172 (2) of the statutes and to

the governor concerning the issue of continuation of their functions, including the feasibility of combination of their functions.

OPERATIVE STATUTES, DEFINITIONS, DUTIES, FUNDING AND AID TO COUNTIES

16.966 Land Information Support.

(1) In this section, "state agency" has the meaning given for "agency" under s. 16.045 (1)(a).

NOTE: Sub. (1) is repealed effective September 1, 2003 by 1997 Wisconsin Act 27.

(3) The department may develop and maintain geographic information systems relating to land in this state for the use of governmental and nongovernmental units.

(4) The department shall provide staff services to the land information board.

NOTE: Sub. (4) is repealed effective September 1, 2003 by 1997 Wisconsin Act 27. Statutes Applicable to the Wisconsin Land Information Program

16.967 Land Information Program.

(1) **Definitions.** In this section:

(a) "Board" means the land information board.

(b) "Land information" means any physical, legal, economic or environmental information or characteristics concerning land, water, groundwater, subsurface resources or air in this state. "Land information" includes information relating to topography, soil, soil erosion, geology, minerals, vegetation, land cover, wildlife, associated natural resources, land ownership, land use, land use controls and restrictions, jurisdictional boundaries, tax assessment, land value, land survey records and references, geodetic control networks, aerial photographs, maps, planimetric data, remote sensing data, historic and prehistoric sites and economic projections.

(c) "Land information system" means an orderly method of organizing and managing land information and land records.

(d) "Land records" means maps, documents, computer files and any other information storage medium in which land information is recorded.

(e) "Systems integration" means land information that is housed in one jurisdiction or jurisdictional subunit and is available to other jurisdictions, jurisdictional subunits, public utilities and other private sector interests.

(3) **Board Duties.** The board shall direct and supervise the land information program and serve as the state clearinghouse for access to land information. In addition, the board shall:

(a) Provide technical assistance and advice to state agencies and local governmental units with land information responsibilities.

(b) Maintain and distribute an inventory of land information available for this state, land records available for the state and land information systems.

(c) Prepare guidelines to coordinate the modernization of land records and land information systems.

(d) Review project applications received under sub.(7) and determine which projects are approved.

(e) Review for approval a countywide plan for land records modernization prepared under s. 59.72 (3)(b).

(4) **Funding Report.** The board shall identify and study possible program revenue sources or other revenue sources for the purpose of funding the operations of the board, including grants to counties under sub. (7).

(5) **Fees.** All fees received under s. 59.72 (5) (a) shall be credited to the appropriation under s. 20.505 (1) (ij).

(6) **Reports.** By March 31 of each year, the department of administration, the department of agriculture, trade and consumer protection, the department of commerce, the department of health and family services, the department of natural resources, the department of tourism, the department of revenue, the department of transportation, the board of regents of the University of Wisconsin System, the public service commission and the board of curators of the historical society shall each submit to the board a plan to integrate land information to enable such information to be readily translatable, retrievable and geographically referenced for use by any state, local governmental unit or public utility.

The plans shall include the information that will be needed by local governmental units to prepare comprehensive plans containing the planning elements required under s. 66.1001 (2). Upon receipt of this information, the board shall integrate the information to enable the information to be used to meet land information data needs. The integrated information shall be readily translatable, retrievable, and geographically referenced to enable members of the public to use the information.

(7) **Aid to Counties.**

(a) A county board that has established a land information office under s. 59.72 (3) may apply to the board on behalf of any local governmental unit, as defined in s. 59.72 (1) (c), located wholly or partially within the county for a grant for any of the following projects:

1. The design, development and implementation of a land information system that contains and integrates, at a minimum, property and ownership records with boundary information, including a parcel identifier referenced to the U.S. public land survey; tax and assessment information; soil surveys, if available; wetlands identified by the department of natural resources; a modern geodetic reference system; current zoning restrictions; and restrictive covenants.

2. The preparation of parcel property maps that refer boundaries to the public land survey system and are suitable for use by local governmental units for accurate land title boundary line or land survey line information.

3. The preparation of maps that include a statement documenting accuracy if the maps do not refer boundaries to the public land survey system and that are suitable for use by local governmental units for planning purposes.

4. Systems integration projects.

5. To support technological developments and improvements for the purpose of providing Internet-accessible housing assessment and sales data.

(b) Grants shall be paid from the appropriation under s. 20.505 (1) (ij). A grant under this subsection may not exceed \$100,000. The board may award more than one grant to a county board.

(8) **Advice; Cooperation.** In carrying out its duties under this section, the board may seek advice and assistance from the university of Wisconsin system, state agencies, local governmental units and other experts involved in collecting and managing land information. State agencies shall cooperate with the board in the coordination of land information collection.

(9) **Technical Assistance; Education.** The board may provide technical assistance to counties and conduct educational seminars, courses or conferences relating to land information. The board shall charge and collect fees sufficient to recover the costs of activities authorized under this subsection.

(10) **Memorandum of Understanding.** The board shall enter into a memorandum of understanding with the Wisconsin land council to ensure cooperation between the board and the council and to avoid duplication of activities.

NOTE: This section is repealed effective September 1, 2003 by 1997 Wisconsin Act 27.

20.505 Administration, department of.

There is appropriated to the department of administration for the following programs:

(1) Supervision and management; land information board.

(ie) *Land information board; general program operations; incorporations and annexations.* From the moneys received by the land information board under s. 59.72 (5) (a), the amounts in the schedule for general program operations of the board under s. 16.967 and for reviews of proposed municipal incorporations and annexations by the department.

NOTE: Par. (ie) is repealed effective September 1, 2003 by 1997 Wisconsin Act 27.

(ig) *Land information board; technical assistance and education.* The amounts in the schedule for the land information board to provide technical assistance to counties and to conduct educational seminars, courses or conferences under a. 16.967 (9). The charges paid by the counties and participants in education seminars, courses, and conferences under s. 16.967 (9) shall be credited to this appropriation account.

NOTE: Par. (ig) is repealed effective September 1, 2003 by 1997 Wisconsin Act 27.

(ij) *Land information board; aids to counties.* From the moneys received by the land information board under s. 59.72 (5) (a), all moneys not appropriated under pars. (ie), (if), and (ik) for the purpose of providing aids to counties for land information projects under s. 16.967 (7).

NOTE: Par. (ij) is repealed effective September 1, 2003 by 1997 Wisconsin Act 27.

STATUTES RELATED TO COUNTIES

59.43 Register of deeds; duties.

(1) The register of deeds shall:

(u) Submit that portion of recordings fees collected under sub. (2) (ag) 1. and (e) and not retained by the county to the land information board under s. 59.72 (5).

NOTE: Par. (u) is repealed effective September 1, 2003 by 1997 Wisconsin Act 27.

59.43 (2) Register of deeds; fees.

Every register of deeds shall receive the following fees:

(a) 1. In this subsection, "page" means one side of a single sheet of paper.

(ag) 1. Subject to s. 59.72 (5), for recording any instrument entitled to be recorded in the office of the register of deeds, \$11 for the first page and \$2 for each additional page, except that no fee may be collected for recording a change of address that is exempt from a filing fee under s. 185.83 (1) (b).

NOTE: Subd. 1. is affected by 1997 Wisconsin Acts 27, 79 and 252 effective September 1, 2003 to read:

1. For recording any instrument entitled to be recorded in the office of the register of deeds, \$8 for the first page if the county maintains a land information office under s. 59.72 (3) and \$4 for the first page if the county does not maintain such an office, and \$2 for each additional page, except that no fee may be collected for recording a change of address that is exempt from a filing fee under s. 185.83 (1) (b).

(e) Subject to s. 59.72 (5), for filing any instrument which is entitled to be filed in the office of register of deeds and for which no other specific fee is specified, \$11 for the first page and \$2 for each additional page.

NOTE: Par. (e) is amended effective September 1, 2003 by 1997 Wisconsin Act 27 to read:
(e) For filing any instrument which is entitled to be filed in the office of register of deeds and for which no other specific fee is specified, \$8 for the first page if the county maintains a land information office under s. 59.72 (3) and \$4 for the first page if the county does not maintain such an office, and \$2 for each additional page.

59.72 Land Information.

(1) **Definitions.** In this section:

(a) "Land information" has the meaning given in s. 16.967 (1)(b).

(am) "Land information system" has the meaning given in s. 16.967 (1) (c).

(b) "Land records" has the meaning given in s. 16.967 (1) (d).

(c) "Local governmental unit" means a municipality, regional planning commission, special purpose district or local governmental association, authority, board, commission, department, independent agency, institution or office.

(3) **Land Information Office.** The [county] board may establish a county land information office or may direct that the functions and duties of the office be performed by an existing department, board, commission, agency, institution, authority, or office. If the board establishes a county land information office, the office shall:

(a) Coordinate land information projects within the county, between the county and local government units, between the state and local governmental units and among local governmental units the federal government and the private sector.

(b) Within 2 years after the land information office is established, develop and receive approval for a countywide plan for land records modernization. The plan shall be submitted for approval to the land information board under s. 16.967 (3) (e).

(c) Review and recommend projects from local governmental units for grants from the land information board under s. 16.967 (7).

(4) **Aid to Counties.** A board that has established a land information officer under sub. (3) may apply to the land information board for a grant for a land information project under s. 16.967 (7).

(5) **Land Record Modernization Funding.** (a) Before the 16th day of each month a register of deeds shall submit to the land information board \$7 from the fee for recording the first page of each instrument that is recorded under s. 59.43 (2) (ag) 1. and (e), less any amount retained by the county under par. (b).

(b) A county may retain \$5 of the \$7 submitted under par. (a) from the fee for recording the first page of each instrument that is recorded under s. 59.43 (2) (ag) 1. and (e) if all of the following conditions are met:

1. The county has established a land information office under sub (3).

2. A land information office has been established for less than 2 years or has received approval for a countywide plan for land records modernization under sub. (3) (b).

3. The county uses \$4 of each \$5 fee retained under this paragraph to develop, implement, and maintain the countywide plan for land records modernization, and \$1 of each \$5 fee retained under this paragraph to develop and maintain a computerized indexing of the county's land information records relating to housing, including the housing element of the county's land use plan under s. 66.1001 (2) (b), in a manner that would allow for greater public access via the Internet.

NOTE: This section is affected effective September 1, 2003 by 1997 Wisconsin Act 27 to read:

59.72 Land Information. (1) Definitions. In this section:

- (a) "Land information" means any physical, legal, economic or environmental information or characteristics concerning land, water, groundwater, subsurface resources or air in this state. "Land information" includes information relating to topography, soil, soil erosion, geology, minerals, vegetation, land cover, wildlife, associated natural resources, land ownership, land use, land use controls and restriction, jurisdictional boundaries, tax assessment, land value, land survey records and references, geodetic control networks, aerial photographs, maps, planimetric data, remote sensing data, historic and prehistoric sites and economic projections.
- (b) "Land records" means maps, documents, computer files and any other storage medium in which land information is recorded.
- (c) "Local governmental unit" means a municipality, regional planning commission, special purpose district or local governmental association, authority, board, commission, department, independent agency, institution or office.
- (3) Land Information Office. The [county] board may establish a separate county land information office or may direct that an office be established within an existing department, board, commission, agency, institution, authority or office. The county land information office shall coordinate land information projects within the county, between the county and local government units, between the state and local governmental units and among local governmental units, the federal government and the private sector. If the board establishes a land information office, the board shall within 2 years after the land information office is established, develop a countywide plan for land records modernization.
- (5) Land Record Modernization Funding. A county which establishes a land information office shall use \$4 of the \$8 per page received under s. 59.43 (2) (ag) 1. and (e), to develop, implement and maintain a countywide plan for land records modernization.

STATUTES RELATED TO THE DEPARTMENT OF NATURAL RESOURCES

23.27 (3) (a) (Natural Heritage Inventory Program)

Duties. The department, with the advice of the council (Natural Area Preservation Council), shall conduct a natural heritage inventory program. The department shall cooperate with the land information board under s. 16.967 in conducting this program.

This program shall establish a system for determining the existence and location of natural areas, the degree of endangerment of natural areas, an evaluation of the importance of natural areas, information related to the associated natural values of natural areas and other information and data related to natural areas. This program shall establish a system for determining the existence and location of native plant and animal communities and endangered, threatened and critical species, the degree of endangerment of these communities and species, the existence and location of habitat areas associated with these communities and species and other information and data related to these communities and species. This program shall establish and coordinate standards for the collection, storage, and management of information and data related to the natural heritage inventory.

NOTE: Par. (a) is amended eff. 9-1-03 by 1997 Wis. Act 27 to read:

(a) Duties. The department, with the advice of the council, shall conduct a natural heritage inventory program. This program shall establish a system for determining the existence and location of natural areas, the degree of endangerment of natural areas, an evaluation of the importance of natural areas, information related to the associated natural values of natural areas and other information and data related to natural areas. This program shall establish a system for determining the existence and location of native plant and animal communities

and endangered, threatened and critical species, the degree of endangerment of these communities and species, the existence and location of habitat areas associated with these communities and species and other information and data related to these communities and species. This program shall establish and coordinate standards for the collection, storage and management of information and data related to the natural heritage inventory.

23.32 (2) (d) (Wetlands Mapping)

The department shall cooperate with the land information board under s. 16.967 in conducting wetland mapping activities or any related land information collection activities.

NOTE: Par. (d) is repealed eff. 9-1-03 by 1997 Wis. Act 27.

STATUTES RELATED TO THE UNIVERSITY OF WISCONSIN SYSTEM AND THE STATE CARTOGRAPHER

36.09 (1) (e) The board [of Regents] shall appoint a president of the system; a chancellor for each institution; a dean for each college campus; the state geologist; the director of the laboratory of hygiene; the director of the psychiatric institute; the state cartographer with the advice of the land information board; and the requisite number of officers, other than the vice presidents, associate vice presidents and assistance vice presidents of the system; faculty; academic staff and other employees and fix the salaries, subject to the limitations under par. (j) and ss. 20.923 (4g), (4m) and (5) and 230.12 (3)(e), the duties and the term of office for each. The board shall fix the salaries, subject to the limitations under par. (j) and ss.

20.923 (4g), (4m) and (5) and 230.12 (3)(e), and the duties for each chancellor, vice president, associate vice president and assistant vice president of the system. No sectarian or partisan tests or any tests based upon race, religion, national origin or sex shall ever be allowed or exercised in the appointment of the employees of the system.

NOTE: Par. (e) is repealed and recreated eff. 9-1-03 by 1997 Wis. Act 237 to read:

(e) The board shall appoint a president of the system; a chancellor for each institution; a dean for each college campus; the state geologist; the director of the laboratory of hygiene; the director of the psychiatric institute; the state cartographer; and the requisite number of officers, other than the vice presidents, associate vice presidents and assistant vice presidents of the system; faculty; academic staff and other employees and fix the salaries, subject to the limitations under par. (j) and ss. 20.923 (4g), (4m) and (5) and 230.12 (3) (e), the duties and the term of office for each. The board shall fix the salaries, subject to the limitations under par. (j) and ss. 20.923 (4g), (4m) and (5) and 230.12 (3) (e), and the duties for each chancellor, vice president, associate vice president and assistant vice president of the system. No sectarian or partisan tests or any tests based upon race, religion, national origin or sex shall ever be allowed or exercised in the appointment of the employees of the system.

36.25 Special Programs (University of Wisconsin System)

36.25 (12m) **State Cartographer.** (intro.) In coordination and consultation with the land information board, the state cartographer shall:

(a) Establish and maintain a union catalog of current and historical reference and thematic maps of all scales available in municipal, county, state and federal agencies relating to this state.

- (b) Promote liaison among the municipal, county, state and federal mapping agencies and surveyors to facilitate coordination and to exchange information on mapping and cartographic activities.
- (c) Keep abreast of the progress made by mapping agencies and their mapping developments.
- (d) Collect, maintain and disseminate information regarding innovation in cartographic techniques and mapping procedures, map and air photo indexes and control data, map accuracy standards, legal aspects of map publication and such other matters as will facilitate an effective cartographic program for the state.
- (e) Publish and distribute such special maps and map information as will promote the mapping of the state and preparation and use of maps by individuals, only to the extent, however, that such publication and distribution is not appropriately within the activities of any other state or commercial agency.
- (f) Assist the department of natural resources in its work as the state representative of the U.S. geographic board and its other functions under s. 23.25.

NOTE: Sub. (12m)(intro.) is amended eff. 9-1-03 by 1997 Wis. Act 27.

STATUTES RELATED TO THE DEPARTMENT OF AGRICULTURE, TRADE AND CONSUMER PROTECTION

92.10 (4) (a) *Data*. The department (of agriculture, trade and consumer protection) shall develop a systematic method of collecting and organizing data related to soil erosion. The department shall cooperate with the land information board under s. 16.967 in developing this methodology or any related activities related to land information collection.

NOTE: Par. (a) is amended eff. 9-1-03 by 1997 Wis. Act 27 to read: (a) Data. The department shall develop a systematic method of collecting and organizing data related to soil erosion.

Appendix F: Wisconsin Land Information Program Strategic Assessment Matrices

Table 10: Strategic Assessment Matrix for WLIP Foundational (Data) Elements²⁹⁶

	Strategy	No Action Needed	Identify Custodian(s)	Transfer Responsibility	Develop Standards	Adopt Standards	Reconcile Existing Standards	Maintain Standards	Enforce Standards	Revisit Status of Technology	Focus Grants and/or Strategic Investments	Identify Additional Funding Partners	New Funding Source	Provide Technical Assistance	Create Task Force
Foundational Data Elements															
Geographic Reference Frameworks															
Densification of horizontal control from (HARN)															
Densification of vertical control network															
Remonumentation of PLSS Section corners															
Coordinate values on PLSS section corners															
Digital base map in vector format															
Image bases (digital orthophotography)															
Elevation data (terrain matrix, DEM)															
Parcels															
Cadastral or legal evidence															
Parcel boundaries															
Parcel administration															
Parcel identification															
Zoning mapping															
Soils mapping															
Wetlands mapping															
Administrative boundaries															
Street centerlines															
Street addresses															
Land use mapping															
Natural resources															
Infrastructure and facilities mgt.															

Table 11: Strategic Assessment Matrix for WLIP Foundational (Institutional) Elements²⁹⁷

²⁹⁶ Wisconsin Land Council and Wisconsin Land Information Board. 2002. *Report to the Governor and Legislature: An Evaluation of the Functions, Activities and Future Directions*. September 2002. Madison, WI, p. 5.

	Strategy	No Action Needed	Identify Custodian(s)	Develop Standards	Adopt Standards	Reconcile Existing Standards	Maintain Standards	Enforce Standards	Revisit Status of Technology	Enforcement of Existing Authority	New Legislation/Rules	WLIP Strategic Initiative	WLIS Implementation	Monitor Progress (WLIP Survey,	OLIS Staff Activity	Provide Technical Assistance	Create Task Force
Issue																	
Institutional Arrangements																	
Integration																	
Cooperation																	
Interoperability																	
Communication, Education, and Training																	
Communication																	
Education																	
Training																	
Public Access Arrangements																	
Access to data																	
Cost recovery																	
Privacy																	

²⁹⁷ Wisconsin Land Council and Wisconsin Land Information Board. 2002. *Report to the Governor and Legislature: An Evaluation of the Functions, Activities and Future Directions*. September 2002. Madison, WI, p. 5.